STUDIES IN THE SAPOTACEAE, III
DIPHOLIS AND BUMELIA

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A REVISION of certain groups of American Sapotaceae has been undertaken under the auspices of the Chicle Development Co. The present paper comprises a revision of the genera *Dipholis* and *Bumelia*. Current interpretations of the identity of the older types have in general been accepted, since these are in most cases not now available for study. In accordance with Article 19 of the International Rules of Botanical Nomenclature, names which were not validly published have rigorously been excluded from consideration. My concepts of intraspecific units have been given in a previous paper (Bull. Torrey Club 70: 265. 1943). Although a relatively large amount of material, measured by the standards of tropical botany, has been available for study, I keenly feel its inadequacy in a number of species; my confidence in the accuracy of my taxonomic interpretations varies in approximately direct proportion to the number of specimens seen.

I wish to acknowledge my thanks to Mr. B. A. Krukoff, under whose direction this study was prepared, and to the curators of the several herbaria who have provided essential assistance by kindly loaning specimens for study. The abbreviations used hereinafter to indicate these herbaria are as follows:

A — Arnold Arboretum, Harvard University.
CR — Museo Nacional de Costa Rica, San José.
Cu — Estacion Experimental Agronomica, Habana, Cuba.
F — Field Museum (Chicago Natural History Museum).
G — Gray Herbarium, Harvard University.
Mich — University of Michigan, Ann Arbor.
Mo — Missouri Botanical Garden, St. Louis.
NY — New York Botanical Garden.
PA — Philadelphia Academy of Natural Sciences.
PR — Tropical Forest Herbarium, U. S. Forest Service, Río Piedras, Puerto Rico.
US — United States National Herbarium, Washington, D. C.

DIPHOLIS

The genus *Dipholis* was founded in 1844 by Alphonse de Candolle, in the Prodromus, vol. 8, p. 188. The single species listed, *D. salicifolia*, necessarily becomes the type. This species has, incidentally, by far the widest distribution of any in the genus, and is biologically as well as nomenclaturally typical. *Dipholis* is antedated six years by *Spondogona* Raf. (Sylv. Tellur. 35. 1838), based on *Bumelia pentagona* Sw., which is now

referred to *Dipholis salicifolia* on the authority of Radlkofer (Erg. Mon. Serjania, pp. 55–56. 1886). Swartz described the fruit as 5-angled, and Rafinesque, apparently without seeing the type, enlarged upon this description to say that it was also 5-seeded. A 5-seeded or even 5-angled fruit in *Dipholis salicifolia*, or any other known species of the genus, would be a monstrosity, and any name founded on such a specimen should be rejected under Article 65 of the Rules. I should not hesitate to recommend that *Dipholis* be conserved, were it necessary, but *Spondogona* can be rejected on another basis.

Dipholis is closely related to and evidently derived from *Mastichodendron*,[1] from which it differs primarily in the presence of lateral lobes on the corolla-lobes. Several other usual differences, none entirely constant, are found in the more petaloid staminodes, more nearly basal seed-scar, and frequently smaller leaves and fruit of *Dipholis*, the leaves lacking the deeply channeled midrib and petiolar pouch so commonly found in *Mastichodendron*. One species has been described as lacking the lateral lobes on the corolla-lobes, but in my opinion this species is better referred to *Bumelia*. The relationship and distinctions between *Dipholis* and *Bumelia* are discussed under the latter.

Dipholis is confined to the warmer parts of North America and reaches its greatest development in the Greater Antilles, where 10 of the 14 known species occur. Evolutionary trends in the genus are toward reduction in size of the plant, size of the leaves, size of the fruit, and number of flowers in a cluster, and toward the development of a truly basal seed-scar. The most primitive surviving species, such as *D. Stevensonii* and *D. minutiflora*, are good-sized trees with large leaves, large (2–3 cm.) fruits, numerous flowers in a cluster, and somewhat basilateral seed-scar. These species, particularly *D. Stevensonii*, are not far removed from the generic prototype. *Dipholis nigra* is closely allied to *D. minutiflora*, and may be nearly ancestral to *D. salicifolia*. *Dipholis Jubilla* and, from the description, *D. Bellonis* seem most likely to be related to *D. nigra*. *Dipholis parvifolia* and *D. durifolia* seem to be allied to *D. salicifolia*. The closely related species *D. montana* and *D. octosepala* are probably derived from the *D. nigra-salicifolia* stock. *Dipholis cubensis*, *D. repens*, and *D. ferruginea* form a closely knit group that is related to *D. montana*. *Dipholis sericea* is probably allied to the *D. cubensis* group.

Dipholis A. DC.

Unarmed shrubs or trees; leaves alternate, exstipulate, often small; primary lateral veins not very numerous, sometimes obscure; sepals mostly 5, sometimes 4–9; corolla 5(rarely 6)-lobed, each lobe with a pair of lateral lobes or appendages near its base; staminodes present, more or less petaloid, these and the appendages more or less erose, fimbriate, or laciniate; ovary

[1] The name *Mastichodendron*, as used by Lam (Rec. Trav. Bot. Néerl. 36: 521. 1939), is at this writing not yet validly published. It is intended to validate this name in another paper, publication of which may precede this paper.

glabrous, very rarely shortly appressed-hairy; ovules 5, attached basilaterally; young and mature fruit generally tapering abruptly to the short persistent style; fruit fleshy, mostly 1-seeded, not over about 3 cm. long; seed-scar very nearly basal, rarely evidently basilateral; endosperm well-developed.

Key to the Species

1. Fruit about 2 cm. long; leaves 8–12 cm. long; poorly known plant of Puerto Rico... ..... 5. *D. Bellonis.*
1. Fruit (where known) about 1 cm. long or less, except in some Jamaican and continental species; leaves various.
2. Inflorescences borne on peduncles up to 15 mm. long, sometimes slightly branched; Oriente, Cuba..... 4. *D. Jubilla.*
2. Inflorescences sessile, simple.
3. Flowers numerous, commonly 8 or more in a cluster, generally borne at defoliated nodes, sometimes also in the axils.
4. Fruit 12–30 mm. long; pedicels 4–15 mm. long; leaves often but not always retuse or rounded; sepals glabrous or hairy.
5. Leaves densely and loosely rufous-hirsutulous beneath, eventually more or less glabrate; pedicels 10–15 mm. long; petioles 2.5–4 cm. long; sepals strongly and loosely hairy, about 3.5 mm. long or more; British Honduras. ..... 1. *D. Stevensonii.*
5. Leaves glabrous or merely sericeous-strigose beneath, the hairs appressed; pedicels 4–10 mm. long; petioles 0.5–2 cm. long; sepals glabrous or with a few appressed hairs, at flowering time less than 2.5 mm. long.
6. Fruit about 1.5–3 cm. long, yellow to purplish; leaves tardily glabrate beneath, the hairs silvery; continental..... 2. *D. minutiflora.*
6. Fruit 12–16 mm. long, black; leaves very soon glabrate, the hairs when present often reddish; Jamaica..... 3. *D. nigra.*
4. Fruit 6–10 mm. long; pedicels 1–4 mm. long; leaves acute or acuminate; sepals distinctly hairy; general distribution..... 6. *D. salicifolia.*
3. Flowers few, commonly about 1–7 in a cluster, borne in the axils.
4. Leaves strongly acuminate, closely and conspicuously reticulate-veiny; continental.
5. Leaves about 6–10 cm. long, borne on petioles about 1.5–2.5 cm. long; pedicels 5–7 mm. long; sepals strongly and rather loosely ferrugineous, about 3–4 mm. long; British Honduras..... 7. *D. durifolia.*
5. Leaves only 2.5–4 cm. long, borne on petioles about 3–7 mm. long; flowers subsessile, the sepals glabrous or slightly strigose, about 2 mm. long; Costa Rica..... 8. *D. parvifolia.*
4. Leaves mostly obtuse or rounded, if evidently acuminate then not closely and conspicuously reticulate-veiny; Greater Antilles.
5. Corolla at least 6 mm. long, or if perhaps sometimes not so, then the sepals 8 or 9; sepals commonly but not always more than 5; Jamaica.
6. Outer 2 sepals essentially glabrous; fruit about 13–18 mm. long; veiny reticulum of the leaves scarcely raised; sepals 5–8..... 9. *D. montana.*
6. Sepals all hairy; fruit about 1 cm. long or less; veiny reticulum of the leaves evidently raised beneath; sepals 8 or 9..... 10. *D. octosepala.*
5. Corolla not over 4.5 mm. long; sepals 5, rarely 6; not of Jamaica.
6. Leaves glabrous, sometimes sparsely hairy when young.
7. Erect shrubs or trees; leaves 1.5–10 cm. long; Cuba, Hispaniola, and Puerto Rico..... 11. *D. cubensis.*
7. Creeping or prostrate shrub; leaves 1.5–2 cm. long; Hispaniola..... ..... 12. *D. repens.*
6. Leaves strongly rufous-sericeous beneath, eventually paler or glabrate; Dominican Republic.

7. Leaves 4–8 cm. long, 1.5–3 cm. wide, eventually glabrate; venation evident, raised.....13. *D. sericea.*
7. Leaves 2–4 cm. long, 1–1.5 cm. wide, permanently hairy; venation obscure.....14. *D. ferruginea.*

1. **Dipholis Stevensonii** Standl. Trop. Woods 11: 21. 1927.
Sideroxylon rufotomentosum Standl. Carnegie Inst. Wash. Misc. Publ. 461(Bot. Maya Area 4): 79. 1935.

Tree up to 25 m. high; leaves elliptic or elliptic-obovate, rounded at the apex, about 10–22 cm. long and 6–12 cm. wide, strongly veiny, the primary lateral veins about 12--16 pairs, raised beneath; leaves densely and loosely hirsutulous-tomentose with rufous hairs at first, soon glabrate above, eventually more or less glabrate beneath; petioles 2.5–4 cm. long; flowers numerous in clusters at defoliated nodes, the pedicels about 10–15 mm. long, rufous-tomentose; mature flowers unknown, but maturing buds 5- or 6-merous, the sepals about 3.5 mm. long or more, the corolla-lobes 2 mm. long, the anthers 1.5 mm. long, the staminodes ovate, scarcely erose, nearly 1.5 mm. long, the lateral appendages narrow, entire or subentire, only 0.5–1 mm. long; fruit ellipsoid, about 16–25 mm. long, resembling that of *Mastichodendron;* seed up to about 16 mm. long, the scar basilateral, ellipsoid, 5 mm. long, the seed-coat about 1 mm. thick.

TYPE COLLECTION: *Stevenson s.n.*, British Honduras, 1927 (F—fragment, US).

LOCAL NAME: *Zapote faisan.*

DISTRIBUTION: British Honduras.

BRITISH HONDURAS: *Lundell 6200* (F, G, NY, US), *6252* (G, NY, US); *Schipp S674* (F, G, Mo); *Stevenson s.n.* (1926) (US).

The large veiny leaves, somewhat channeled midrib, relatively long petioles, relatively large fruit, and basilateral rather than basal seed-scar of this species are suggestive of *Mastichodendron,* to which it makes an approach, but the petaloid staminodes and the definite, if smaller than usual, lateral lobes on the corolla-lobes clearly indicate its place in *Dipholis.*

2. **Dipholis minutiflora** Pittier, Contr. U. S. Nat. Herb. 13: 464. 1912.
Sideroxylon Matudai Lundell, Phytologia 1: 221. 1937.
Bumelia tabascensis Lundell, Contr. Univ. Mich. Herb. 5: 22. 1940.
Sideroxylon Steyermarkii Standl. Field Mus. Publ. Bot. 22: 368. 1940.
Dipholis Matudai Lundell, Contr. Univ. Mich. Herb. 7: 43. 1942.

Tree up to 30 m. high; leaves elliptic-oblanceolate or narrowly elliptic-obovate, rounded to acutish at the apex, tapering to the base, about 6–20 cm. long and 2.5–10 cm. wide, with 10–20 pairs of primary lateral veins, glabrous above, finely white-strigose beneath, eventually glabrate; petioles about 0.5–1.5 cm. long; flowers very numerous in clusters at defoliated nodes, the pedicels slender, nearly glabrous, 5–8 mm. long; sepals 5, glabrous or nearly so at flowering time, about 1.4–2.2 mm. long; corolla about 4.5 mm. long, the 5 lobes 3.5 mm., their lateral appendages lance-ovate, acuminate, erose-laciniate, 1.5 mm. long on the inner margin; filaments firm, about 2–2.5 mm. long; anthers about 2 mm. long, sagittate to the middle or beyond; staminodes laciniate, 2.5–3 mm. long; fruit yellow, olive-green, or purplish, ovoid to subglobose, usually conical-acute at the apex, about 1.5–3 cm. long, with thin pulp; seeds about 14–18 mm. long, a little compressed, with broadly ellipsoid basal or basilateral scar 5 mm. long; seed-coat about 0.5 mm. thick.

TYPE COLLECTION: *Tonduz 11935,* forests of El Copey, Dota Mountains, Costa Rica, about 1800 m., February, 1898 (NY, US).

LOCAL NAMES: *Sapote prieto, nispero.*

DISTRIBUTION: State of Mexico, Mexico, to the Panama Canal Zone.

MEXICO: Mexico: *Hinton 4923* (G), *7700* (G). Guerrero: *Hinton 10416* (G). Tabasco: *Matuda 3455* (Mich, NY). Chiapas: *Matuda 571* (A, Mo, US), *4175* (A, F, NY). GUATEMALA: San Marcos: *Steyermark 37615* (F). Quezaltenango: *Steyermark 33858* (F). Suchitepéquez: *Steyermark 35409* (F). HONDURAS: Comayagua: *Edwards P-302* (A, F). Yoro: *von Hagen 1007* (F, NY). COSTA RICA: *Austin Smith 4184* (F); *Standley & Valerio 46505* (A, US), *46481* (US). PANAMA: Chiriquí: *Allen 1564* (F, G); *White 109b* (F, G); *Woodson, Allen & Seibert 995* (A, F). Canal Zone: *Allen 1314* (F, G, US).

3. **Dipholis nigra** (Sw.) Griseb. Fl. Brit. W. Ind. 400. 1861.
Bumelia nigra Sw. Prodr. 49. 1788.
Achras nigra Poir. in Lam. Encyc. Meth. 6: 532. 1804.
Dipholis nigra var. *brachyphylla* Urb. Symb. Ant. 5: 137. 1904.

Tree up to 15 m. tall; leaves elliptic or narrowly elliptic-ovate, commonly acute or acutish, sometimes obtuse or bluntly acuminate, glabrous, veiny, with evident reticulum, commonly 6–18 cm. long, 3–6.5 cm. wide, the petioles 1.5–3 cm. long; flowers numerous in clusters at defoliated nodes, the pedicels about 4–10 mm. long, essentially glabrous; sepals essentially glabrous, about 1.5–2 mm. long; corolla about 3.9–4.4 mm. long, the tube 1.1–1.5 mm.; corolla-lobes cordate-auriculate above the lateral lobes, which are shorter and broader than those of *D. salicifolia;* filaments up to 3 mm. long, stout, except for the tenuous tip, as in *D. salicifolia;* anthers about 1.4–1.8 mm. long, more evidently sagittate than in *D. salicifolia;* staminodes ovate, petaloid, erose, about 2 mm. long or more; style 1 mm. long or less, conical; fruit black, ellipsoid to ovoid-globose, 12–16 mm. long, up to 12 mm. thick.

TYPE COLLECTION: None given; reference to Browne, Hist. Jam. 201. 1756.

LOCAL NAME: *Red bullet* or *bully.*

DISTRIBUTION: Jamaica; reported, probably incorrectly, from Cuba.

JAMAICA: *Alexander s.n.* (1850) (G, US); *Britton 1105* (NY), *3688* (NY); *Harris 5388* (A, G, NY, US); *Miller 1389* (US); *Rehder s.n.* (Feb. 13, 1903) (A); *Hart 1057* (US); *Taylor 220* (NY).

4. **Dipholis Jubilla** Ekm. ex Urb. Symb. Ant. 9: 415. 1925.

Tree; leaves lanceolate or elliptic, glabrous nearly from the first, commonly 5–15 cm. long, 2–5.5 cm. wide, acute or acuminate, the primary lateral veins evident beneath, the secondary ones obscure, not forming an evident reticulum; petioles about 1–2.5 cm. long; flower-clusters borne on peduncles up to 15 mm. long, the inflorescence sometimes slightly branching; pedicels about 2–3 mm. long, finely ferrugineous; sepals finely and sparsely ferrugineous, 2.5 mm. long in bud; mature flowers and fruit unknown.

TYPE COLLECTION: *Ekman 8324,* "ad Alto de Iberia in cacumine montis cr. 1135 m.," November 12, 1916 (A, F, NY).

LOCAL NAMES: *Jubilla, juba prieto.*

DISTRIBUTION: Oriente, Cuba.

CUBA: Oriente: *Ekman 4249* (G, NY), *5574* (US), *9369* (NY), *15659* (G, US); *León 19877* (NY); *Roig 5316* (Cu), *6209* (Cu, NY).

The leaves of *D. Jubilla* are somewhat similar to those of *D. nigra*, but may be distinguished by the lack of an evident veiny reticulum.

5. **Dipholis Bellonis** Urb. Symb. Ant. 5: 137. 1904.

Leaves 8–12 cm. long, 2.5–4 cm. wide, ovate-oblong, acute at the base, acuminate at the apex, borne on petioles 1–2 cm. long; fruiting pedicels 10–15 mm. long; fruit obovoid, sometimes narrowly so, 18–20 mm. long, 10–15 mm. thick, violet-blackish. (Description taken from the original; no specimens seen.)

TYPE COLLECTION: *Bello*, near Furnias, Puerto Rico.

LOCAL NAME: *Varital.*

DISTRIBUTION: Known only from the type collection, Puerto Rico.

6. **Dipholis salicifolia** (L.) A. DC. in DC. Prodr. 8: 188. 1844.
Achras salicifolia L. Sp. Pl. ed. 2. 1: 470. 1762.
Bumelia salicifolia Sw. Prodr. 50. 1788.
Bumelia pentagona Sw. loc. cit.
Sideroxylon pauciflorum Lam. Tab. Encyc. 2: 42. no. 2459. 1793.
Achras pentagona Poir. in Lam. Encyc. Meth. 6: 533. 1804.
Sideroxylon salicifolium Gaertn. f. Carp. Suppl. 124. *t. 202.* 1805.
Spondogona nitida Raf. Sylv. Tellur. 35. 1838.
Sideroxylon pentagonum A. DC. in DC. Prodr. 8: 185. 1844.
Dipholis salicifolia var. *jamaicensis* Pierre in Urb. Symb. Ant. 5: 139. 1904.
Spondogona salicifolia House, Am. Midl. Nat. 7: 131. 1921.
?*Dipholis leptopoda* Urb. Ark. Bot. 22A(17): 70. 1929.

Large shrub, or more commonly a tree, sometimes nearly 25 m. high; leaves narrowly elliptic to elliptic-lanceolate or elliptic-oblanceolate, acute or acuminate at both ends, commonly 5–11 cm. long and 1.5–4 cm. wide, villosulous when young, but very soon glabrate, the petioles short, commonly 0.5–1.5 cm. long; flowers numerous in clusters at defoliated nodes or sometimes in the axils, the pedicels finely sericeous, about 1–4 mm. long; sepals finely hairy, about 1.4–3 mm. long; corolla about 3.3–4.5 mm. long, the tube 1.3–1.6 mm.; corolla-lobes rounded, elliptic, narrowed to a short claw-like base above the lateral lobes or appendages, which are acute or acuminate, lanceolate or ovate; staminodes ovate or broadly elliptic, petaloid, about 1.5–2 mm. long, more or less erose-laciniate; filaments about 1.5–2.5 mm. long, very stout and firm except for the short abruptly tenuous distal portion; anthers about 0.9–1.6 mm. long, exserted; ovary 5-loculate, glabrous or rarely slightly hairy, the style 1.5–2.5 mm. long; fruit black, with thin pericarp, broadly ellipsoid or subglobose, about 6–10 mm. long, with 1 or sometimes 2 or 3 seeds; seed-scar basal, circular or elliptic, 1 mm. in greatest diameter; seed-coat about 0.2–0.3 mm. thick, light to dark brown.

TYPE COLLECTION: None given; references to works of Sloane and Browne on Jamaica.

LOCAL NAMES: *White bullet* or *bully, mijico;* for many others see Symb. Ant. 5: 138. 1904.

DISTRIBUTION: Southern Florida; Bahama Islands; Greater Antilles; Virgin Islands, and sparingly through the Lesser Antilles to Guadeloupe and the Barbados Islands; southern Mexico, Guatemala, and British Honduras. Specimens from Florida are so numerous that I have cited only a small proportion of them.

U.S.A.: Florida: *Curtiss 1760* (A, NY, US), *5859* (NY, US); *Duckett 223* (A, F, NY, US); *Moldenke 750* (NY, US), *5701* (NY); *Pollard et al. 197* (NY, US);

Small & Mosier 5509 (NY), *5652* (NY), *5760* (NY), *6553* (NY), *6591* (NY, US); *Tracy 9252* (NY, US). BAHAMAS: *Brace 3893* (NY, US), *4620* (NY), *4932* (NY), *6737* (NY); *Britton 10* (NY, US), *112* (NY), *3376* (G, US), *6434* (NY, US); *Britton & Brace 188* (NY); *Britton & Millspaugh 2579* (NY), *5610* (NY); *Coker 257* (NY), *395* (NY); *Cooper 3* (NY); *Curtiss 148* (A, G, NY, US); *Earle 50* (NY); *Eggers 4106* (F, NY, US); *Northrop 326* (A, F, G, NY); *Small & Carter 8459* (G, NY, US); *Wight 143* (G, NY), *1905* (F); *Wilson 7438* (G, NY), *7725* (G, NY), *8172* (NY), *8287* (NY), *8422* (NY). CUBA: Isla de Pinos: *Britton, Wilson & León 15270* (G, NY, US). Habana: *León 8524* (NY), *10674* (NY); *León & Edmund 8764* (NY). Matanzas: *Britton & Wilson 14045* (US). Santa Clara: *Britton, Earle & Wilson 5888* (NY, US); *Britton & Wilson 5527* (NY); *Ekman 18353* (A); *Jack 4215* (A), *4351* (A), *4808* (A, US), *5608* (A, US), *5661* (A), *5675* (A, US), *6015* (A, US); *León 398* (NY); *Rehder 1119* (A); *Shafer 12310* (NY, US). Camaguey: *Shafer 436* (NY), *677* (G, NY, US), *934* (G, NY, US), *1045* (G, NY, US). Oriente: *Britton 1875* (NY); *Britton & Cowell 12613* (NY, US); *Britton, Cowell & Shafer 13065* (NY, US); *Ekman 4629* (G, US), *4894* (A, F, US), *7715* (NY), *8596* (F, G); *Shafer 1313* (NY), *1503* (NY, US); *Wright 1325* (G, NY, US). JAMAICA: *Alexander s.n.* (1850) (NY, US); *Britton 1887* (NY), *1949* (NY); *March s.n.* (NY); *Eggers 3509* (A, US); *Hansen s.n.* (1897) (A, F, US); *Harris 5511* (NY), *7070* (NY), *8642* (NY), *8949* (NY), *9616* (NY, US), *10170* (NY, US), *10806* (NY, US); *Hart 611* (NY); *Miller 1363* (US), *1413* (US); *Perkins 1264* (G); *Rothrock 141* (NY), *231* (F). HAITI: *Holdridge 987* (US); *Leonard 3204* (G, NY, US), *8870* (G, NY, US), *12376* (A, G, US), *14850* (NY, US), *15743* (A, G, NY, US). DOMINICAN REPUBLIC: *Abbot 1295* (G, US), *2248* (G, US), *2867* (G, US); *Ekman 14380* (US); *Fuertes 210* (A, G, NY, US); *Rose, Fitch & Russell 4233* (A, G, NY, US); *Scarff 2a* (F); *Wright et al. 305* (F). PUERTO RICO: *Britton & Brown 6367* (NY); *Britton & Marble 2333* (NY, US); *Holdridge 321* (PR); *Johnston* 909 (NY), *1862* (NY); *Sargent 438* (US); *Shafer 2761* (NY, US); *Sintenis 733* (G), *733b* (NY, US), *3640* (G, NY, US); *Stevenson 1862* (A, US). ST. JOHN: *Holdridge 132* (NY). TORTOLA: *Fishlock 401* (A, F, G, NY, US), *402* (A). ST. CROIX: *Thompson 759* (NY). ST. EUSTATIUS: *Boldingh 1168* (NY). GUADELOUPE: *Duss 2913* (A, F, G, NY, US); *Stehlé 2870* (US). MARIE GALANTE: *Stehlé 420* (NY). BARBADOS: *Bovell 468* (NY). ST. ANDREW (Barbados): *Bovell & Freeman 374* (NY). MEXICO: Vera Cruz: *Gaumer 2150* (G); *Purpus 2031* (NY, US). Puebla: *Purpus 3382* (F, US). Campeche: *Lundell 1346* (F, NY, US). Yucatán: *Flores s.n.* (1936) (F); *Gaumer s.n.* (1888) (F), *1047* (A, F, G, US), *2150* (A, F, US), *23516* (A, F, G, US), *23632* (A, F, G, US); *Lundell 7557* (A); *Seler 3993* (A, F, G, US). GUATEMALA: El Petén: *Bartlett 12679* (A, F, NY, US); *Lundell 3058* (F, G, US), *3098* (F), *3197* (F), *3354* (A), *3690* (F). BRITISH HONDURAS: *Karling s.n.* (1931) (A, F, US); *Lundell 3895* (F); *Schipp S-650* (A, F, G, NY).

Dipholis leptopoda Urb. & Ekm. was based on some immature specimens which have unusually few flowers for *D. salicifolia*, but which do not seem to belong anywhere else. The leaves are also broader and more obtuse than is general for the species, and it may eventually prove to be distinct.

7. **Dipholis durifolia** Standl. Carnegie Inst. Wash. Misc. Publ. 461 (Bot. Maya Area 4): 78. 1935.

Tree 6 m. high; leaves lanceolate, strongly acuminate, 6–10 cm. long, 1.5–2.5 cm. wide, quite glabrous at least at maturity, conspicuously and finely reticulate-veiny on both sides; petioles about 1.5–2.5 cm. long; flowers 1–6 in the axils, the stout ferrugineous pedicels 5–7 mm. long; sepals strongly ferrugineous, about 3.2–4 mm. long; corolla about 5 mm. long or more, the tube about equaling the lobes; staminodes petaloid, ovate, erose, about 2–2.5 mm. long; ovary glabrous, 5-celled, its style about 2–2.5 mm. long; fruit unknown.

TYPE COLLECTION: *Schipp 1202,* bare hilltop, Jacinte Hills, British Honduras, 700 feet, September 8, 1933 (A, F, G, NY).

DISTRIBUTION: Known only from the type collection, British Honduras.

This species and *D. parvifolia* are evidently closely related; their relationship to other species in the genus is uncertain, but *D. salicifolia* may be suggested as the nearest relative.

8. **Dipholis parvifolia** Standl. Field Mus. Publ. Bot. 18: 909. 1938.

Tree; leaves elliptic-lanceolate, long-acuminate, 2.5–4.5 cm. long, 1–1.5 cm. wide, glabrous, firm, closely and conspicuously reticulate-veiny on both sides, but the veins not much raised; petioles 3–7 mm. long; flowers borne singly or in very small groups in the axils, nearly sessile, the sepals about 2 mm. long, sparsely strigose or glabrous; fruit obovoid, about 17 mm. long.

TYPE COLLECTION: *Standley & Valerio 45525,* wet forest, Los Ayotes, near Tilarán, Guanacaste, Costa Rica, 600–700 m., January 21, 1926 (US).

DISTRIBUTION: Known only from the type collection, Guanacaste, Costa Rica.

9. **Dipholis montana** (Sw.) Griseb. Fl. Brit. W. Ind. 401. 1861.
Bumelia montana Sw. Prodr. 49. 1788.
Achras montana Poir. in Lam. Encyc. Meth. 6: 533. 1804.
Dipholis pallens Pierre & Urb. in Urb. Symb. Ant. 5: 136. 1904.
Dipholis lanceolata Pierre in Urb. Symb. Ant. 5: 136. 1904.

Shrub or small tree sometimes as much as 15 m. high; leaves elliptic to broadly or narrowly obovate, broadest at or generally above the middle, commonly 3–11 cm. long, 2–5.5 cm. wide, obtuse to abruptly short-acuminate, glabrous, veiny, but the reticulum scarcely raised; petioles about 3–10 mm. long; flowers in axillary clusters of about 2–7, the stout pedicels thinly strigose, 2–6 mm. long, elongating in fruit; sepals 5–8, the 2 outer glabrous or sparingly strigose, generally shorter than the others, about 2–4 mm. long, the inner evidently though finely sericeous-strigose, commonly 3–4 mm. long; corolla about 6.3 mm. long, the tube and bases of the staminodes thick and firm, the lobes and their appendages thin; corolla-tube about 3.2 mm. long or more; filaments about 1.5 mm. long or a little less, stout, tapering from the base; anthers about 0.8–1.1 mm. long; staminodes orbicular-obovate, about 1.5 mm. long, fimbriate, thickened toward the base; style about 1–2 mm. long, the stigma slightly expanded; ovary 5-loculate; fruit ellipsoid or ellipsoid-ovate, about 13–18 mm. long, 9–12 mm. thick; seed (from fruit 18 mm. long) 13 mm. long, 10 mm. thick, with basal or elliptic scar 3.5 mm. long; seed-coat dark brown, 0.4–0.6 mm. thick.

TYPE COLLECTION: None given.

LOCAL NAMES: *White bullet* or *bully, black bullet* or *bully.*

DISTRIBUTION: Jamaica.

JAMAICA: *Britton 270* (NY), *1107* (NY); *Harris 5340* (NY), *5355* (NY), *5370* (A, G, NY), *5704* (A, F, US), *5777* (NY), *6691* (A, NY, US), *6731* (NY, US), *9742* (NY, US), *9803* (NY, US), *10118* (NY, US), *10807* (A, G, NY, US); *Hart 533* (US), *642* (F, US); *Miller 1267* (US), *1297* (US); *Shreve s.n.* (May 16, 1906) (NY).

10. **Dipholis octosepala** Urb. Symb. Ant. 7: 324. 1912.

Tree up to 10 m. high; leaves rufous-tomentulose when young, later glabrate, elliptic to ovate or obovate, 9–12 cm. long, 4–6 cm. wide, obtuse to acuminate, the veins obscure above, raised and forming an evident retic-

ulum beneath; petioles 1.5–2.5 cm. long; flowers about 2–4 in the axils, the stout pedicels up to 5 mm. long, rufous-hairy; sepals about 8 or 9, spiraled, all finely and loosely rufous-hairy, about 3–4 mm. long; mature corolla unknown; lateral appendages of the corolla-lobes erose-laciniate; staminodia well developed, fimbriate; fruit ellipsoid or subglobose, about 1 cm. long or a little less, with 1 or 2 seeds; seed-coat about 0.3 mm. thick.

TYPE COLLECTION: *Harris 10986,* "ultra Clarendon in sylvis Peckham dictis," July, Jamaica (NY).

DISTRIBUTION: Jamaica, all of the collections from the same station.

JAMAICA: *Harris 11049* (NY), *12798* (NY, US).

In its few-flowered clusters, stout pedicels, and numerous sepals, this species resembles *D. montana,* but differs in having all the sepals loosely hairy, in having a smaller fruit, and in the differently shaped thicker leaves with longer petioles and with raised veiny reticulum beneath.

11. **Dipholis cubensis** (Griseb.) Pierre in Urb. Symb. Ant. 5: 140. 1904.
Bumelia cubensis Griseb. Cat. Pl. Cub. 164. 1866.
Dipholis cubensis var. *oblongata* Pierre in Urb. Symb. Ant. 5: 140. 1904.
Dipholis domingensis Pierre & Urb. in Urb. Symb. Ant. 5: 140. 1904.
Dipholis Sintenisiana Pierre in Urb. Symb. Ant. 5: 139. 1904.
Dipholis angustifolia Urb. Symb. Ant. 7: 323. 1912.
Dipholis Ekmaniana Urb. Symb. Ant. 9: 416. 1925.

Much-branched shrub or small tree up to 10 m. tall; leaves firm, glabrous, oblanceolate to obovate or elliptic, acute at the base, rounded to acutish at the apex, about 2–10 cm. long and 6–30 mm. wide; petioles 2–10 mm. long; flowers about 1–4 in a cluster, the pedicels 2–20 mm. long, glabrous or hairy; sepals about 1.8–2.5 mm. long, glabrous or strigose; corolla about 2.7–3.7 mm. long, the lobes a little shorter than the tube, which sometimes bears scattered long red hairs; filaments about 0.5–1.6 mm. long; anthers about 0.8 mm. long; staminodes petaloid, erose or laciniate, less than 1 mm. long; style short and stout, about 0.4–0.7 mm. long; fruit purple or reddish, or perhaps sometimes green, about 5–13 mm. long and 3–7 mm. thick, oliviform-ellipsoid to ovoid; seed-scar basal, a little over 1 mm. wide; seed-coat about 0.4 mm. thick.

TYPE COLLECTION: *Wright 2921,* near Monteverde, Oriente, Cuba (G, Mo, NY, US — drawing).

DISTRIBUTION: Pinar del Río and Oriente, Cuba, to Hispaniola and Puerto Rico.

CUBA: *Wright 1326* (G), *1327* (G). Pinar del Río: *Ekman 17527* (NY, US); *León 13200* (NY), *13837* (NY). Oriente: *Ekman 2296* (NY, US), *2713* (F), *5562* (G), *6017* (NY), *9330* (NY, US), *9407* (NY, US), *9886* (US), *10008* (NY), *14326* (A, F, G, US); *León 10828* (NY), *11959* (NY); *León et al. 10210* (NY); *Roig 47* (NY), *6550* (Cu); *Shafer 3033* (NY), *3461* (NY, US), *3563* (NY, US), *3801* (NY, US); *Wright 1637* (F, G). HAITI: *Buch 1857* (US), *1923* (US); *Cook, Scofield & Doyle 26* (US); *Ekman H9420* (US), *H10594* (US), *H1875* (US); *Holdridge 1384* (US); *Leonard 7591* (US), *8069* (US), *8387* (G, NY, US), *9545* (US), *13242* (NY, US), *13430* (NY, US), *13488* (A, US), *13489* (G), *14845* (US), *14867* (US), *15017* (US); *Nash 722* (NY), *822* (NY), *840* (NY); *Nash & Taylor 1415* (NY, US). DOMINICAN REPUBLIC: *Ekman H11079* (US), *H13707* (US), *H13846* (US), *H15405* (US); *Fuertes 362* (A, G, NY, US), *577* (A), *1831* (A, NY); *Valeur 459* (A, US), *804* (A, NY, US). PUERTO RICO: *Britton 7836* (NY); *Britton & Hess 2559* (NY, US); *Gerhart 321* (NY); *Gregory 388* (PR); *Sintenis 183* (G, NY, US).

There is considerable variation within this species in size and shape of

the fruit, length of the pedicels, and distribution of the leaves, and at first I thought that several species, bolstered by geography, might be recognized on these bases. It now seems plain, however, that these characters are unstable, and that only one species is involved. It is possible that the plants from Hispaniola should be distinguished intraspecifically, from those of Cuba, on the basis of the usually smaller and less firm leaves, which tend to be well distributed along the twigs, instead of clustered at the ends. The Puerto Rican plants, however, have the leaves clustered at the ends of the twigs, like those from Cuba, while retaining the texture of those from Hispaniola.

12. **Dipholis repens** Urb. & Ekm. Ark. Bot. 22A(17): 70. 1929.

Creeping or prostrate shrub; leaves obovate or oblong-obovate, 1.5–2 cm. long, 6–11 mm. wide, or the upper smaller, acute at the base, rounded at the apex, glabrous except when very young; petioles 2–3 mm. long; flowers 1 or 2 in the axils, the pedicels 1–3 mm. long; sepals 5, the 2 outer glabrous, 1.5 mm. long, the 3 inner appressed-hairy, 2 mm. long; corolla white, fragrant, 4 mm. long, the lobes surpassing the tube; filaments scarcely 1 mm. long; style 1 mm. long; fruit brown-purple, obovate-oblong or ellipsoid, 5–6 mm. long, 3.5–4 mm. thick, 1-seeded. (Description abstracted from the original; no specimens seen.)

TYPE COLLECTION: *Ekman H6790,* "Cordillera de Bahoruco in Sierra de los Comisarios in pinetis ultra 1700 m. alt.," August, Barahona, Dominican Republic (US).

DISTRIBUTION: Haiti and the Dominican Republic.

This species is obviously related to *D. cubensis,* but differs in its creeping habit and smaller leaves.

13. **Dipholis sericea** sp. nov.

Planta lignosa; foliis firmiter chartaceis oblanceolatis vel anguste ellipticis, circiter 4–9 cm. longis et 1.5–3 cm. latis, apice rotundatis vel abrupte et breviter acuminatis, subtus primo rufo-sericeis demum glabratis, nervis lateralibus primariis et minus secundariis subtus elevatis perspicuisque, rete venularum laxo; petiolis circiter 3–8 mm. longis; floribus in axillis 1–4, pedicellis crassis ferrugineis circiter 2–4 mm. longis; sepalis plerumque 6 interdum 4, subtiliter et interdum sparse ferrugineis, late et valde imbricatis, circiter 3.5–3.7 mm. longis vel extimo plerumque manifeste breviore; corolla (in alabastro tantum visa) cum appendicibus fimbriatis staminodiisque cito caduca; ovario glabro in stylum 2 mm. longum abrupte contracto; fructu ignoto.

TYPE: *Ekman H14261,* Cordillera Central, prov. Santo Domingo, Villa Altagracia, top of Loma Marian Chicle, mossy thicket, about 825 m., Dominican Republic, January 6, 1930 (US).

DISTRIBUTION: Known only from the type collection, Dominican Republic.

Although mature flowers of *D. ferruginea* are not yet available, maturing buds indicate that its flowers are significantly smaller than those of *D. sericea.* The leaves of the two species differ conspicuously in size, shape, and venation.

14. **Dipholis ferruginea** Ekm. & Schmidt, Rep. Sp. Nov. 32: 94. 1933.

Large tree; leaves firm, narrowly elliptic, oblong, rounded at the apex,

2–4 cm. long, 1–1.5 cm. wide, glabrous, shining above, densely sericeous beneath, the hairs at first strongly rufous, later pale; petioles about 2–5 mm. long; flowers mostly 1 or 2 in the axils, the pedicels less than 6 mm. long, densely rufous-hairy.

TYPE COLLECTION: *Ekman H15406,* "Cordillera Central, prov. de Samana, Los Haitises, Boca del Infierno," limestone crags, light forest, characteristic, June 24, 1930, Dominican Republic (US).

DISTRIBUTION: Known only from the type collection, Dominican Republic, but reported by the collector to be very common.

BUMELIA

The genus *Bumelia* was described in 1788 by Swartz, in his Prodr. Veg. Ind. Occ., p. 49. Of the seven species there included, four have been removed to *Dipholis* and one to *Mastichodendron,* leaving only *B. rotundifolia* and *B. retusa. Bumelia retusa,* being the more common and widespread of the two, may well stand as the nomenclatural type of the genus. *Bumelia* is antedated 11 years by *Robertia* Scop., but it has been conserved by an international botanical congress. Otto Kuntze rejected *Bumelia* in favor of *Lycioides* L. (1738), but, since he gave neither descriptions nor references to descriptions for his numerous transfers (other than *L. spinosum*), his names are not validly published and are here ignored. Rafinesque proposed for *B. tenax* a new genus *Scleroclad*us, which he later modified to *Sclerozus,* but this has universally and correctly been reduced to synonymy.

In 1923 Lecomte described a new species, *Bumelia Harmandii,* from Indo-China (Bull. Mus. Nat. Hist. Par. 29: 179). Its floral and vegetative characters would seem from the description to be wholly consonant with *Bumelia,* although the leaves are somewhat larger than those of any other known species of the genus. In the absence of fruits, its true generic position is uncertain. The genus *Bumelia* is otherwise strictly American.

Bumelia is related to and evidently derived from *Dipholis,* from which it differs primarily in the absence of endosperm. The differences between the two genera may be tabulated as follows:

BUMELIA	DIPHOLIS
Seeds without endosperm; cotyledons fleshy.	Seeds with endosperm; cotyledons thin.
Ovary usually hairy, occasionally glabrous.	Ovary nearly always glabrous.
Plant commonly spiny or thorny.	Plant unarmed.
Young and mature fruit commonly broadly rounded to subtruncate or even retuse at the apex.	Young and mature fruit commonly abruptly tapering to the style.
Lateral lobes of the corolla-lobes sometimes wanting.	Lateral lobes of the corolla-lobes always present.
Well-developed on the continent as well as in the West Indies.	Principal development in the Greater Antilles.

According to Record (Trop. Woods 59: 33. 1939) there is also some difference in the wood-anatomy.

Although *Bumelia* and *Dipholis* have almost universally been considered

distinct, they were united by Baehni in his survey of the family (Candollea 7: 394–508. 1938). In that and subsequent works Baehni denies the significance of endosperm, pointing out that there are cases where the character is known to fail. All other characters in the family also fail on occasion, however, including the type of seed-scar, on which Baehni founds his subfamilies. The fact is that students of the group have repeatedly noted that the presence or absence of endosperm runs parallel to natural groupings which are otherwise discernible, and this is also the case with *Dipholis* and *Bumelia*. It is not ordinarily necessary to dissect a mature seed to distinguish between the two genera. Baehni's objection to the endosperm character seems also to be founded on the practical difficulties in determining its presence in herbarium specimens, a view with which I can sympathize but not agree.

Bumelia has a considerable number of widespread and highly variable species, and specific lines must frequently be drawn rather broadly. Even then constant tangible characters are all too few, although I have seen very little evidence of hybridization. Length of the pedicels has frequently been used as a specific character, but, except in certain cases of subsessile versus evidently pedicellate flowers, it appears to be of very little value. There is a great deal of variation in pubescence, and many species have been founded on pubescence characters. It is true that the kind and color of the pubescence are very helpful in delimiting the entities, but there is a strong tendency for the hairs to fade and fall off progressively with advancing maturity, so that the young leaves and twigs may be very different in appearance from more mature ones.

The species which occur in the United States have recently been revised by Clark (Ann. Mo. Bot. Gard. 29: 155–182. 1942), who recognized 14 species and several additional varieties. My observations as to the constancy of certain characters, such as the variegation of the seeds in several species, the glabrous ovary in *B. reclinata*, and the entire versus erose corolla-lobes in "*B. texana*" and related entities, are quite contrary to Clark's. I am able to recognize only 5 species in the United States; Asa Gray's treatment in the second edition of the Synoptical Flora is reasonably adequate to distinguish these. Not a single valid species of *Bumelia* seems to have been described from the United States since the appearance of Michaux's flora in 1803. Since Clark cites numerous specimens, and his entities are in general readily equated with mine, I am not citing specimens for the 5 species concerned. In general, all other specimens from outside the United States are cited, except those which belong to widespread species and bear incomplete data.

The most primitive surviving species of the genus is *B. persimilis*. The general similarity of this species to *Dipholis salicifolia* has several times been remarked, and it seems not to be accidental. *Bumelia persimilis* may very well be only slightly removed from the prototype of the genus. Evolutionary trends are toward reduction in size of the whole plant, in size of the leaves and prominence of their veiny reticulum, in size of fruits, and

sometimes in the number of flowers in a cluster. I have found the construction of a satisfactory key more than ordinarily difficult. The one here presented follows the natural lines as nearly as possible, at the expense, in some cases, of serviceability in identification.

Bumelia Sw.

Shrubs or trees, commonly but not always spiny; leaves alternate or casually opposite, exstipulate, often small; primary lateral veins not very numerous, sometimes obscure; flowers mostly 5-merous throughout, sometimes casually 4- or 6-merous; corolla-lobes each with a pair of lateral lobes or appendages at the base, or these sometimes suppressed; staminodes present, petaloid, entire to erose or laciniate; ovary usually more or less hairy, sometimes glabrous; ovules solitary in the locules, ordinarily 5, attached basilaterally; young and mature fruit generally broadly rounded or subtruncate to even retuse at the apex; fruit fleshy, mostly 1-seeded, not over about 2.5 cm. long; seed-scar small, nearly basal; endosperm wanting.

Key to the Species

1. Corolla-lobes with lateral appendages (except rarely in South American *B. obtusifolia*).
   2. Fruit large, about 1.5–2.5 cm. long; Mexico to Venezuela.
      3. Fruit smooth, not gall-like; pubescence various.
         4. Leaves large, the larger mostly 5–12 cm. long; primary lateral veins about 10–30 pairs.
            5. Petioles mostly 2–10 mm. long; style 3–7 mm. long; leaves variable in pubescence, but not finely sericeous-strigose with tardily deciduous gray-white hairs beneath; sepals hairy or sometimes glabrous; Mexico to Venezuela.....1. *B. persimilis.*
            5. Petioles mostly 10–20 mm. long; style mostly 2–3 (rarely 4) mm. long; leaves finely sericeous-strigose with tardily deciduous gray-white hairs beneath; sepals glabrous; Mexico only.....2. *B. laetevirens.*
         4. Leaves smaller, about 2–4.5 cm. long; primary lateral veins about 4–10 pairs; Queretaro, Mexico.....3. *B. Altamiranoi.*
      3. Fruit gall-like, covered with short densely rufous-tomentose processes; twigs and lower leaf-surfaces finely velutinous-tomentose, at least when young; Oaxaca, Mexico.....4. *B. eriocarpa.*
   2. Fruit smaller, about 6–15 mm. long.
      3. Leaves closely and conspicuously reticulate-veiny, the veins evidently raised; style short, about 0.8–2 mm. long; species of the United States and northeastern Mexico.
         4. Leaves either loosely woolly beneath or soon glabrate, the reticulum evident on both sides.
            5. Fruit 7–15 mm. long; ovary always hairy; Florida to Missouri, Arizona, and Mexico.
               6. Leaves loosely woolly-villous beneath (soon subglabrate in some chiefly far western forms), variable in size.....5. *B. lanuginosa.*
               6. Leaves finely silvery-strigose or -sericeous beneath when young, soon glabrate, the larger commonly 4–13 cm. long; extending west only to eastern Texas.....6. *B. lycioides.*
            5. Fruit 4–7 mm. long; ovary often glabrous; leaves loosely hairy beneath when young, soon glabrate, the larger ones mostly 1.5–4.5 cm. long; Florida.....7. *B. reclinata.*
         4. Leaves sericeous-tomentose beneath with usually tawny or rufous hairs, sometimes becoming merely sericeous-strigose in age, but only very rarely

glabrate, the pubescence obscuring the reticulum of the lower leaf-surfaces; South Carolina to Florida.....8. *B. tenax.*

3. Leaves not conspicuously reticulate, or, if occasionally so, then the style more than 2 mm. long; species, except *B. celastrina,* not of the United States and northeastern Mexico.
4. Leaves not fascicled, except rarely on older branches.
5. Leaves smooth or more or less veiny, not finely reticulate-striate, nor with a peculiar texture; general distribution, except Hispaniola, Puerto Rico, and the Lesser Antilles.
6. Leaves essentially glabrous from the first; Jamaica....10. *B. rotundifolia.*
6. Leaves more or less pubescent, at least when young.
7. Pubescence of the leaves gray, or in South American forms often slightly tawny; southern Mexico to Argentina.....9. *B. obtusifolia.*
7. Pubescence of the leaves strongly rufous, at least when young.
8. Leaves sericeous beneath, tardily glabrate; Bahamas, Cuba, Navassa, Jamaica, and along the mainland coast from southern Vera Cruz to British Honduras.....11. *B. retusa.*
8. Leaves merely strigose beneath, generally soon glabrate; San Luis Potosí to Guerrero, west to Baja California; Socorro.
9. Leaves relatively large, about 4–8 cm. long; Socorro Island.....12. *B. socorrensis.*
9. Leaves smaller, about 2–4.5 (or in *B. verruculosa* 5.5) cm. long; mainland.
10. Staminodia not all hooded; sepals not at all cartilaginous at the base; flowers relatively large, the corolla about 7.5 mm. long, the anthers 2.5–2.7 mm.; Baja California.....13. *B. peninsularis.*
10. Staminodia more or less hooded; sepals cartilaginous at the base; flowers relatively small, the corolla about 4.5–5 mm. long, the anthers about 1.6–2 mm. long; Sinaloa and San Luis Potosí to Guerrero.
11. Staminodia glabrous, laciniate-margined; twigs soon glabrate, not verruculose; Sinaloa to Guerrero.....14. *B. cartilaginea.*
11. Staminodia villous, entire-margined; twigs soon becoming verruculose with the persistent firm bases of the hairs; San Luis Potosí.....15. *B. verruculosa.*
5. Leaves with a peculiar texture, due largely to the very fine reticulated striations trending parallel to the primary lateral veins, not otherwise reticulate; Hispaniola, Puerto Rico, Lesser Antilles, northern Venezuela, and coastal islands.....16. *B. obovata.*
4. Leaves fascicled, or occasionally not so on vigorous young shoots of *B. celastrina.*
5. Leaves with a peculiar texture, due largely to the very fine reticulated striations trending parallel to the primary lateral veins, not otherwise reticulate; Hispaniola, Puerto Rico, Lesser Antilles, northern Venezuela, and coastal islands.....16. *B. obovata.*
5. Leaves not with such a texture, not finely reticulate-striate; general distribution, except Puerto Rico and the Lesser Antilles.
6. Fruit dark red, subglobose, less than 1 cm. long; hairs of the leaves and twigs rufous, at least when young; Cuba and Hispaniola.....17. *B. glomerata.*
6. Fruit blue-black, ellipsoid-cylindric, about 7–15 mm. long; hairs of the leaves and twigs gray, white, or wanting; not of Hispaniola, nor of Cuba except in Camaguey.
7. Leaves, twigs, pedicels, and sepals finely gray-puberulent, sometimes eventually glabrate; Baja California and Sonora, Mexico.....18. *B. occidentalis.*

7. Leaves, twigs, pedicels, and sepals glabrous from the first, or with only a few inconspicuous white strigose hairs when young; Texas and adjacent Mexico, south to Venezuela, and Florida, Bahamas, and Camaguey, Cuba.....19. *B. celastrina.*

1. Corolla-lobes without lateral appendages, or sometimes a mere vestige remaining in *B. conferta;* Cuba and Hispaniola.
   2. Leaves essentially glabrous from the first; flowers 1–4 in a cluster.
      3. Leaves 1.5–3.5 cm. wide; pedicels about 6–10 mm. long; Cuba.....20. *B. conferta.*
      3. Leaves 0.5–1.5 cm. wide; pedicels 2 mm. long or less; Hispaniola..21. *B. Picardae.*
   2. Leaves strongly rufous-hairy beneath at least when young, sometimes subglabrate in age; flowers various.
      3. Flowers about 5–25 in a cluster; leaves 1.5–2.5 cm. wide, the primary lateral veins evident beneath; Dominican Republic.....22. *B. integra.*
      3. Flowers solitary or 2 in the axils; leaves less than 1 cm. wide, only the midrib visible beneath; Oriente, Cuba.....23. *B. revoluta.*

1. **Bumelia persimilis** Hemsl. Biol. Centr. Am. Bot. 2: 298. 1882.

Heavy-trunked spiny tree or large shrub, about 5–18 m. tall; leaves firm, ovate-oblong to elliptic or broadly elliptic-lanceolate, obtuse to more commonly acutish or acuminate, the larger about 5–12 cm. long and 2–5 cm. wide, from conspicuously velvety or spreading-villous with rufous hairs to finely strigose with rufous or gray hairs beneath when young, sooner or later generally more or less glabrate; primary lateral veins about 10–30 pairs, more or less evident, but not always sharply distinct from the larger secondary ones, the final reticulum evident or obscure, but not raised and conspicuous; petioles mostly 3–10 mm. long; flowers several or numerous in axillary clusters, from subsessile to sometimes borne on pedicels fully 1 cm. long; sepals densely rufous-hairy to glabrous, about 1.8–3.7 mm. long; corolla about 3–6 mm. long, the tube about 1.2–1.8 mm. long; anthers included or slightly exserted, 0.8–2 mm. long; staminodes about 1.7–3.8 mm. long, lanceolate to obovate, more or less laciniate; ovary short-pilose, especially near the base, to sometimes glabrous; style 3–7 mm. long; fruit oblong or ellipsoid to spheroidal, about 1.5–2.5 cm. long, reputedly sweet and edible.

TYPE COLLECTION: *Botteri 989,* Orizaba, Vera Cruz, Mexico (F — fragment, G, US).

DISTRIBUTION: Chihuahua, Mexico, to Federal District, Venezuela.

1A. **Bumelia persimilis** subsp. **typica** nom. nov.

Bumelia persimilis Hemsl. Biol. Centr. Am. Bot. 2: 298. 1882, sens. strict.
Bumelia leiogyna Donnell Smith, Bot. Gaz. 18: 4. 1893.
Bumelia pleistochasia Donnell Smith, loc. cit.
Bumelia megaphylla Blake, Contr. Gray Herb. n. ser. 52: 76. 1917.
Bumelia guatemalensis Standl. Trop. Woods 4: 9. 1925.
Bumelia panamensis Standl., loc. cit.
Bumelia barba-tigris Pittier, Man. Pl. Us. Venez. 125. 1926.
Bumelia Lankesteri Standl. Trop. Woods. 31: 40. 1932.
Bumelia Austin-Smithii Standl. Field Mus. Publ. Bot. 18: 905. 1938.
Bumelia elexochitlensis Schultes & Conzatti, Leafl. Bot. Mus. Harv. Univ. 9: 190. 1941.

Pubescence of the young twigs fine, appressed or a little loose, reddish or often gray, often sparse, that of the lower surfaces of the leaves fine, strictly appressed, and commonly soon deciduous, reddish or gray; corolla and style sometimes fully as long as in subsp. *subsessiliflora,* sometimes only

about 3 mm. long; sepals and ovary sometimes glabrous; fruit commonly spheroidal, sometimes more elongate.

LOCAL NAMES: *Corpus espina, doncello, espino blanco, espino de crujo, ispundio, limoncello, morespino, porcupine tree, tempisquito, zapotillo de peña, zapotillo bravo.*

DISTRIBUTION: Vera Cruz and Oaxaca, Mexico, to Federal District, Venezuela.

MEXICO: *Haenke 1139* (F); *Haenke 1596* (F); *Haenke 1600* (F, NY); *Haenke 1601* (F, NY). Vera Cruz: *Purpus 13071* (A, F, Mo, NY). GUATEMALA: El Petén: *Egler 42–214* (F). San Marcos: *Steyermark 37199* (A, F). Quezaltenango: *Steyermark 34370* (F). Guatemala: *Aguilar 193* (F). Sacatepéquez: *Donnell Smith 1451* (G, NY, US); *Donnell Smith 2184* (G, NY, US); *Standley 58875* (F); *Standley 58898* (F). Escuintla: *Standley 64784* (A, F, NY). Jutiapa: *Standley 75645* (F); *Standley 76223* (F); *Standley 76304* (F); *Steyermark 31791* (F). BRITISH HONDURAS: *Peck 756* (G); *Schipp 1077* (A, F, G, Mich, Mo, NY); *Schipp 1339* (A, F, G, Mich, Mo, NY). EL SALVADOR: *Calderón 294* (NY, US); *Calderón 313* (G, Mo, NY, US); *Calderón 1554* (US). COSTA RICA: *Brenes 3874* (CR, F); *Lankester 1194* (F); *Lankester 1258* (F). Guanacaste: *Standley & Valerio 45491* (US); *Standley & Valerio 46426* (US). Alajuela: *Austin Smith H163* (F); *Austin Smith H229* (F); *Austin Smith H610* (F, US); *Austin Smith 2685* (US). Cartago: *Oersted 315* (US); *Standley 35881* (US). PANAMA: Panama: *Kluge 12* (F, NY, US). COLOMBIA: Atlántico: *Dugand 508-B* (US); *Elias 486* (NY, US); *Elias 698* (NY, US); *Elias 1170* (A, NY, US). Bolívar: *Killip & Smith 14487* (A, G, NY, US). VENEZUELA: *Tamayo 1155* (US). Zulia: *Tejera 57* (G, US). Federal District: *Pittier 5856* (NY); *Pittier 9163* (G, NY, US).

1B. **Bumelia persimilis** subsp. **subsessiliflora** (Hemsl.) comb. nov.

Bumelia subsessiliflora Hemsl. Biol. Centr. Am. Bot. 2: 299. 1882.
Bumelia arborescens Rose, Contr. U. S. Nat. Herb. 1: 339. 1895.
Bumelia stenosperma Standl. Contr. U. S. Nat. Herb. 23: 1117. 1924.
Bumelia Lesueurii Standl. Field Mus. Publ. Bot. 22: 365. 1940.

Pubescence of the young twigs dense, rufous, spreading, often coarsely velvety, that of the lower surfaces of the leaves similar but often longer, looser, and less reddish, and commonly becoming appressed before eventually falling; corolla and style seldom under 4.5 mm. long; sepals and ovary always more or less hairy; fruit commonly oblong or ellipsoid.

TYPE COLLECTION: *Galeotti 7198,* Guadalajara, Jalisco, Mexico, 3000 feet (F — fragment).

LOCAL NAMES: *Bebelama, cupia, cupilla.*

DISTRIBUTION: Chihuahua and Durango to Michoacán and Oaxaca, Mexico.

MEXICO: Chihuahua: *Gentry 2451* (F); *Hewitt s.n.* (A); *LeSueur 1160* (F); *LeSueur 1171* (G); *Lumholtz 528* (G); *Zing A13* (F). Sinaloa: *Ortega 223* (G, US); *Ortega 4241* (US); *Rose, Standley & Russell 13893* (G, Mo). Durango: *Gentry 5261* (G, Mo, NY). Colima: *Palmer 1123* (A, G, Mich, Mo, NY, US). Michoacán: *Leavenworth & Hoogstraal 1393* (Mo). Oaxaca: *Nelson 2548* (F, US).

Bumelia persimilis is one of the several species in the genus with very wide ranges. It is characterized by its large leaves, broadest at or below the middle, with relatively numerous lateral veins, and without a conspicuous raised reticulum, by its large fruit, and by its relatively long style. Herbarium specimens do not indicate an unusual amount of intraspecific variability, except in pubescence, on which two subspecies may be founded. Some specimens from Guatemala, which have mostly been passing as *B. pleistochasia,* have a slightly different aspect than most others of the species and tend to have smaller flowers. Field study may show that

varietal recognition is warranted, but from the herbarium material it seems yet quite unjustified. *Bumelia Austin-Smithii* Standl., from Costa Rica, was described by the collector as having a pronounced nipple on the fruit, but it does not seem otherwise different. Careful field investigation may show the need for varietal recognition. *Bumelia stenosperma* Standl., described as having leaves only 1.5–3 cm. long, is merely subsp. *subsessiliflora* with the leaves young and not yet fully expanded. It should be noted that specimens of subsp. *subsessiliflora* with immature foliage have been collected in August, as well as in the spring, suggesting that some factor other than temperature, perhaps rainfall, has a controlling influence.

2. **Bumelia laetevirens** Hemsl. Biol. Centr. Am. Bot. 2: 298. 1882.
Bumelia mexicana Engl. Bot. Jahrb. 12: 519. 1890.
Bumelia Palmeri Rose, Gard. & For. 7: 195. 1894.
Achras olivacea Sesse & Moc. Fl. Mex. 91. 1894.

Spreading heavy-trunked tree much like *B. persimilis,* up to 15 m. tall, the herbarium specimens, at least, nearly always unarmed; leaves elliptic or ovate, broadly rounded to obtuse or acutish at the apex, firm, smooth and shining above, finely strigose or sericeous-strigose with tardily deciduous white hairs beneath, the larger commonly 6–12 cm. long and 2.5–6 cm. wide; venation much like *B. persimilis,* the secondary lateral veins sometimes a little more raised above; petioles about 10–20 mm. long; flowers numerous in axillary clusters, the pedicels commonly 2–8 mm. long; sepals glabrous, about 2–3.5 mm. long; corolla about 3–6 mm. long, the tube about 0.8–1.8 mm. long; anthers about 1–1.9 mm. long, slightly exserted; ovary sparsely pilose, especially below; style mostly 2–3 (rarely 4) mm. long; fruit black, subglobose, mostly 1.5–2 cm. long, edible.

TYPE COLLECTION: *Galeotti 7000,* Cordillera of Oaxaca, Mexico, at 3000 feet.

LOCAL NAMES: *Bebalama, cupia, tempesquistle.*

DISTRIBUTION: Sinaloa to Tamaulipas, south to Oaxaca and Vera Cruz, Mexico.

MEXICO: *Liebmann 311* (US); *Liebmann 312* (US); *Sesse, Mociño et al. 5151* (F). Sinaloa: *Collins & Kempton 69* (US); *Gentry 5494* (F, G); *Ortega 795* (F); *Ortega 4174* (US); *Ortega 4503* (US); *Ortega 4532* (US); *Ortega 5647* (US); *Ortega 5686* (US); *Ortega 5847* (G, US); *Ortega 6703* (F, Mo, US); *Palmer 1513* (G, NY, US); *Rose, Standley & Russell 13897* (G, Mo). Durango: *Goldman 334* (F, G, US). Tamaulipas: *LeSueur 644* (F); *LeSueur 648* (F); *Palmer 212* (G, Mo, NY, US). San Luis Potosí: *Palmer 48* (G, NY, US). Tepic: *Maltby 99* (US). Hidalgo: *Chase 7441* (F, G, Mo, NY). Vera Cruz: *Botteri 1014* (G, US); *Palmer 364* (G, Mo, NY, US). Mexico: *Matuda 1229* (A, Mich, Mo). Puebla: *Pringle 13872* (G, Mich, US); *Purpus 5849* (G, Mo, NY, US); *Rojans 4* (US); *Rose et al. 10140* (NY, US). Oaxaca: *Conzatti 2481* (F); *Conzatti 3459* (US); *Conzatti 4612* (US); *Conzatti 4618* (US).

This species is obviously related to *B. persimilis,* and none of the characters separating it from that species, sens. amplior., shows real discontinuity. I have seen no evidence of hybridization, however, and am convinced that the two are properly considered distinct. It should be noted that *B. persimilis* subsp. *typica,* which sometimes approaches *B. laetevirens* in pubescense, does not occur through most of the range of the latter.

3. **Bumelia Altamiranoi** Rose & Standl. Contr. U. S. Nat. Herb. 23: 1117. 1924.

Spiny tree or shrub; young twigs loosely tomentose with gray-white or

at first tawny-rufous hairs; leaves ovate to elliptic-oblong, broadly rounded to acutish at the apex, 2.5–4.5 cm. long, 1.5–3 cm. wide, woolly-villous with persistent white hairs beneath, more finely hairy and eventually glabrate above; primary lateral veins about 4–10 pairs; secondary lateral veins forming a loose scarcely raised reticulum above; petioles about 3–6 mm. long; flowers unknown; fruit about 1.5–2 cm. long, subglobose, the pedicel 3 mm. long, woolly-villous, the persistent sepals about 3–4 mm. long, similarly white-hairy.

TYPE COLLECTION: *Rose, Painter & Russell 9725,* near Cadereyta, Queretaro, Mexico, August 21, 1905 (NY, US).

DISTRIBUTION: Known only from the type locality, Queretaro, Mexico. Another collection is *Altamirano 1644* (US).

This species resembles forms of the more northern *B. lanuginosa* in pubescence but it has smaller, less reticulate leaves, and larger fruit. It may also be compared to *B. persimilis,* which has larger leaves with more numerous lateral veins, and in which the pubescence, if spreading, is always rufous.

4. **Bumelia eriocarpa** Greenman & Conzatti, Field Mus. Publ. Bot. 2: 334. 1912.

More or less thorny; twigs coarse, finely velutinous-tomentose, at least when young; leaves narrowly elliptic, lance-elliptic, or elliptic-oblong, rounded at the apex, the larger commonly 5–9 cm. long and 18–30 mm. wide, smooth and shining above, densely and sometimes very finely velutinous-tomentose beneath with gray or sometimes tawny, persistent or tardily deciduous hairs; primary lateral veins about 5–12 pairs; secondary veins few, forming a loose reticulum above and beneath; petioles about 5–10 mm. long; flowers in clusters axillary to leaves or leaf-scars, subsessile, the pedicels less than 2 mm. long, tawny-tomentose; sepals about 2.5–3.5 mm. long, hairy like the pedicels; corolla about 5–6 mm. long, the tube 1.7–2 mm. long; anthers 2 mm. long; ovary densely long-hairy; style 4 mm. long; fruit 1.5–2 cm. long, ellipsoid-globose, gall-like in appearance, covered with very short densely rufous-tomentose processes; seed (from a fruit 2 cm. long) 1.6 cm. long, its scar nearly orbicular, basilateral, 6.5 mm. long.

TYPE COLLECTION: *Conzatti 1586,* Cerro San Antonio, 1700 m., October 28, 1906, Oaxaca, Mexico (F, NY, US).

DISTRIBUTION: Oaxaca, Mexico.

MEXICO: Oaxaca: *Conzatti 1772,* Cerro del Tule, 1700 m. (F, G); *Conzatti 2028,* Cerro San Antonio, 1600 m. (F); *Smith 159,* Mts. of Jayacatlán, 4500 ft. (G).

Although evidently related to *B. persimilis, B. Altamiranoi,* and *B. lanuginosa,* this species is readily distinguished by its gall-like fruit. Additional differences will be noted when it is compared with any one of the related species.

5. **Bumelia lanuginosa** (Michx.) Pers. Syn. 1: 237. 1805.

Shrub or tree about 1–15 m. tall, more or less thorny; leaves oblanceolate to sometimes obovate or elliptic, broadly rounded to sometimes acute at the apex, mostly 2–10 cm. long and 0.5–3.5 cm. wide, loosely woolly-villous with white to tawny or rufous hairs when young, soon glabrate above, persistently hairy to sometimes soon glabrate beneath, reticulate-veiny on both sides, sometimes fascicled; flowers more or less numerous in each cluster,

the hairy or subglabrous pedicels 2–15 mm. long; sepals strongly hairy or nearly glabrous, 1.5–3.2 mm. long; corolla about 3–4.7 mm. long, the tube 1.3–2 mm. long; staminodes deltoid-ovate, about 1.9–2.7 mm. long, nearly equaling the corolla-lobes; anthers 1–1.5 mm. long; ovary pilose; style 1–1.5 mm. long; fruit obovoid to broadly ellipsoid or subglobose, commonly purplish-black, 7–12 mm. long.

TYPE COLLECTION: *Michaux,* Georgia.

DISTRIBUTION: Mostly in uplands, occasionally in bottoms; Florida to Missouri and Kansas, south to Texas, southern Arizona, and the northern tier of states in Mexico.

Key to the Subspecies

1. Larger leaves mostly 5–10 cm. long (occasionally smaller in ssp. *typica*); often over 5 m. tall; Florida to Missouri, Kansas, Oklahoma, eastern and central Texas, and Coahuila and Nuevo León, Mexico.
   2. Pubescence of the leaves persistently tawny or rufous; almost entirely east of the Mississippi River.....ssp. *typica.*
   2. Pubescence of the leaves gray or nearly white, occasionally tawny at first, before the leaves are fully expanded; almost entirely west of the Mississippi River.....ssp. *oblongifolia.*
1. Larger leaves mostly 2–5 cm. long; seldom over 4–5 m. tall; southwestern Oklahoma, through central and western Texas, to southern Arizona and the northern tier of states in Mexico.....ssp. *rigida.*

5A. **Bumelia lanuginosa** subsp. **typica** nom. nov.

Sideroxylon lanuginosum Michx. Fl. Bor. Am. 1: 122. 1803.
Bumelia lanuginosa Pers. Syn. 1: 237. 1805, sens. strict.
Chrysophyllum ludovicianum Raf. Fl. Ludovic. 53. 1817.
Bumelia rufa Raf. New Fl. N. Am. 3: 29. 1836.
Bumelia ferruginea Nutt. N. Am. Sylva 3: 34. 1849.

Characters and distribution as given in the key.

5B. **Bumelia lanuginosa** subsp. **oblongifolia** (Nutt.) stat. nov.

Characters and distribution as given in the key.

TYPE COLLECTION: *Nuttall,* Arkansas (same as *B. oblongifolia* Nutt.) (PA).

5B1. **Bumelia lanuginosa** subsp. **oblongifolia** var. **oblongifolia** (Nutt.) Clark, Ann. Mo. Bot. Gard. 29: 163. 1942 (as *B.l.* var. *o.*).

Bumelia oblongifolia Nutt. Gen. 1: 135. 1818.
Bumelia arachnoidea Raf. New Fl. N. Am. 3: 28. 1836.
Bumelia tomentosa A. DC. in DC. Prodr. 8: 190. 1844.
Bumelia arborea Buckl. Proc. Phil. Acad. 1861: 461. 1862.

Pubescence not very dense, generally merely grayish; pedicels tending to be short and stout. Range of the subspecies.

5B2. **Bumelia lanuginosa** subsp. **oblongifolia** var. **albicans** Sarg. Jour. Arnold Arb. 2: 168. 1921 (as *B.l.* var. *a.*).

Pubescence of the leaves long, dense, white or nearly so, commonly less tangled than in var. *oblongifolia;* pedicels tending to be long and slender, with some conspicuously spreading hairs. Texas and southeastern Oklahoma, extending into Nuevo León.

TYPE COLLECTION: *Sargent s.n.,* Guadelupe River bottoms, Victoria, Victoria County, Texas, April 9, 1915 (A).

5C. **Bumelia lanuginosa** subsp. **rigida** (A. Gray) stat. nov.

Characters and distribution as given in the key.

TYPE COLLECTION: Same as *B. lanuginosa* var. *rigida* A. Gray.

5C1. **Bumelia lanuginosa** subsp. **rigida** var. **rigida** A. Gray, Syn. Fl. ed. 2. 2(1): 68. 1886 (as *B.l.* var. *r.*).

Bumelia rigida Small, Bull. N. Y. Bot. Gard. 1: 444. 1900.

Pubescence of the leaves persistent, or only in age partly deciduous; pedicels and sepals evidently hairy. Southwestern Oklahoma, through central Texas to northern Mexico, thence west to southern Arizona.

TYPE COLLECTION: Not specified, from among collections by *Wright, Palmer, Pringle,* and *Lemmon.*

5C2. **Bumelia lanuginosa** subsp. **rigida** var. **texana** (Buckl.) comb. nov.

Bumelia texana Buckl. Bull. Torrey Club 10: 90. 1883.

Bumelia monticola Buckl. op. cit. 91.

Bumelia riograndis Lundell, Contr. Univ. Mich. Herb. 8: 77. 1942.

Pubescence of the leaves finer and less dense than in var. *rigida,* soon largely deciduous except for a few hairs along the midrib; pedicels and sepals usually sparsely hairy or subglabrous, sometimes more evidently hairy. Southwestern Oklahoma, western and central Texas, and adjacent Mexico.

TYPE COLLECTION: *Buckley s.n.,* mountains near the lower crossing of the Pecos River on the road from Ft. Stockton to old Fort Lancaster and the head of Devil's River (NY).

The data on herbarium labels would indicate that subspecies *typica* and *oblongifolia* do not ordinarily ascend to more than about 1500 feet, while subspecies *rigida* seldom descends below that level. The range of variation in pubescence of subsp. *oblongifolia* and subsp. *rigida* is about the same, although the latter is much more often soon subglabrate than the former. The division of subsp. *oblongifolia* into var. *oblongifolia* and var. *albicans* is comparable to the division of subsp. *rigida* into var. *rigida* and var. *texana,* but the line is not drawn in just the same place. The var. *texana* is much less hairy than the average of its counterpart, var. *oblongifolia.* In each of these two subspecies, the two varieties share a large part of their range in common, but have entirely individual range-outlines. The varieties of ssp. *rigida* are fairly well defined, but clearly intergrade. As shown on Clark's map, var. *texana* occurs frequently through a large part of western Texas where var. *rigida* is apparently absent. The varieties of subsp. *oblongifolia,* on the other hand, are rather poorly defined, and the range of var. *albicans* is entirely included within that of var. *oblongifolia.* The typical subspecies is apparently always rather copiously hairy. The nearest thing to a subglabrate phase is furnished by *B. reclinata,* which also differs in its lower habit, smaller leaves, and smaller fruit, and seems quite distinct.

6. **Bumelia lycioides** (L.) Pers. Syn. 1: 237. 1805.

Sideroxylon spinosum Duham. Arb. 2: 260. 1755. Not *Bumelia spinosa* A. DC. 1844.

Sideroxylon lycioides L. Sp. Pl. ed. 2. 279. 1762.

Sideroxylon decandrum L. Mant. 48. 1767.

Robertia decandra Scop. Introd. 154. 1777.

Sideroxylon laeve Walt. Fl. Carol. 100. 1788.

Decateles lycioides Raf. Sylv. Tellur. 36. 1838.

Lycioides spinosum Kuntze, Rev. Gen. 2: 406. 1891.

Bumelia cassinifolia Small, Bull. N. Y. Bot. Gard. 1: 442. 1900.

Bumelia lucida Small, loc. cit., not Roem. & Schult.
Bumelia lycioides var. *virginiana* Fernald, Rhodora 38: 439. 1936.
Bumelia lycioides var. *ellipsoidalis* Clark, Ann. Mo. Bot. Gard. 29: 172. 1942.
Bumelia Smallii Clark, Ann. Mo. Bot. Gard. 29: 172. 1942.

Shrub or small tree, about 1–10 m. tall, often thorny; young twigs glabrous; leaves mostly elliptic or elliptic-oblanceolate and narrowed to the acuminate to obtuse apex, occasionally obovate and broadly rounded, commonly 4–13 cm. long and 1–4.5 cm. wide, occasionally some of them smaller, conspicuously reticulate-veiny on both sides, glabrous above, glabrous or more commonly with a few short hairs chiefly along the midrib beneath, the very young leaves more evidently silvery, but the pubescence evanescent; flowers numerous, commonly about 20–60 in a cluster, the pedicels glabrous or slightly hairy, mostly 4–10 mm. long; sepals glabrous, or with a few reddish hairs within, about 1.4–2.9 mm. long; corolla 3.2–4 mm. long, the tube shorter than or sometimes equaling the lobes; anthers 1.2–1.7 mm. long; style about 1.1–2 mm. long; ovary short-hairy; staminodes ovate or rhombic-ovate, about 1.8–2.4 mm. long; fruit ellipsoid to obovoid or ellipsoid-globose, commonly 7–13 mm. long; seeds about 6–9 mm. long, commonly tan or light brown, occasionally a little variegated.

TYPE COLLECTION: None given; references to several older works.

DISTRIBUTION: River-banks and wet or dry woods; Florida to eastern coastal Texas, north to Arkansas, s. Missouri, s. Indiana, and s. Virginia.

Neither the shape of the fruit nor the shape of the leaf-apex, on which bases varieties have been proposed, shows sufficient constancy to furnish grounds for taxonomic segregation. *B. Smallii* is described by Clark as a small-leaved relative with the leaves only 2–5 cm. long, but several of the collections at the New York Botanical Garden so annotated by Clark have the larger leaves 4.5–8 cm. long, well within the normal range of variation in *B. lycioides*.

7. **Bumelia reclinata** (Michx.) Vent. Choix des Pl. *pl. 22.* 1803.

Low spiny often spreading or decumbent shrub about 0.4–2 m. tall, rarely a little taller; young twigs varying from sparsely white-hairy or subglabrous to densely rufous-tomentulose, eventually glabrate; leaves oblanceolate to nearly obovate or elliptic, rounded to occasionally retuse at the apex, about 0.5–5 cm. long and 0.2–2.5 cm. wide, evidently reticulate-veiny on both sides, hairy when young, the pubescence generally denser, looser, and woollier than in *B. lycioides,* but evanescent; flowers commonly less than 20 in each cluster, the pedicels about 3–13 mm. long, glabrous or appressed-hairy; sepals glabrous or appressed-hairy, mostly 1.3–2.1 mm. long; corolla about 2.6–3.9 mm. long, the tube shorter than the lobes; anthers about 0.6–1.1 mm. long; staminodes lance-elliptic to deltoid-ovate, about 1.3–1.8 mm. long; ovary glabrous or hairy; fruit subglobose, 4–7 mm. long.

TYPE COLLECTION: Michaux, "in dumetis ripariis Georgiae."

DISTRIBUTION: Low, often sandy ground; Florida, extending into southern Georgia. There is also in the Torrey Herbarium a single specimen labeled "Louisiana. Dr. Hale.", which apparently constitutes the sole basis for the frequent inclusion of Louisiana in the cited range.

7A. **Bumelia reclinata** var. **reclinata** (Michx.) comb. nov.
Sideroxylon reclinatum Michx. Fl. Bor. Am. 1: 122. 1803.

Bumelia reclinata Vent. Choix des Pl. *pl. 22.* 1803, sens. strict.
Bumelia macrocarpa Nutt. N. Am. Sylva 3: 34. 1849.
Bumelia lycioides var. *reclinata* A. Gray, Syn. Fl. 2(1): 68. 1878.
Bumelia microcarpa Small, Bull. N. Y. Bot. Gard. 1: 440. 1900.

Pubescence white or grayish, not at all rufous, evanescent; young twigs generally only sparsely hairy; ovary glabrous or sometimes hairy. Range of the species.

7B. **Bumelia reclinata** var. **rufotomentosa** (Small) comb. nov.
Bumelia rufotomentosa Small, Bull. N. Y. Bot. Gard. 1: 440. 1900 (as *B. rufomentosa*).

Pubescence strongly rufous, generally coarser than in var. *reclinata*, a few hairs commonly persisting on the lower leaf-surfaces until maturity; young twigs strongly rufous-tomentulose; ovary generally hairy. Local from Alachua to Orange and Hillsborough Counties, Florida.

TYPE COLLECTION: *Garber s.n.*, Tampa, Hillsborough County, Florida, May, 1876 (NY, US).

8. **Bumelia tenax** (L.) Willd. Sp. Pl. 1: 1085. 1798.
Sideroxylon tenax L. Mant. 48. 1767.
Chrysophyllum carolinense Jacq. Obs. 3: 3. *pl. 54.* 1768.
Sideroxylon sericeum Walt. Fl. Car. 100. 1788.
Sideroxylon chrysophylloides Michx. Fl. Bor. Am. 1: 123. 1803.
Bumelia chrysophylloides Pursh, Fl. Am. Sept. 1: 155. 1814.
Scleroclados tenax Raf. Sylv. Tellur. 35. 1838.
Sclerozus tenax Raf. Aut. Bot. 2: 73. 1840.
Bumelia megacocca Small, Bull. N. Y. Bot. Gard. 1: 441. 1900.
Bumelia lacuum Small, Man. S. E. Fl. 1034. 1933.

Branching thorny shrub or small tree about 1–5 m. tall; young twigs puberulent to sericeous-tomentose with mostly rufous or tawny hairs; leaves oblanceolate to spatulate or sometimes nearly elliptic, rounded at the apex, mostly 1–8 cm. long and 0.4–3.5 cm. wide, glabrous and evidently reticulate-veiny on the upper surface, densely sericeous or sericeous-tomentose with mostly tawny or rufous hairs on the lower surface, the pubescence often obscuring the veins; flowers about 10–30 in a cluster, the clusters sometimes closely aggregated, the pedicels rufous-hairy to occasionally subglabrate, commonly 6–15 mm. long; sepals finely rufous-sericeous or -strigose, about 1.5–3 mm. long; corolla about 3.1–4.2 mm. long, the lobes a little longer than the tube; anthers about 1.1–1.5 mm. long; staminodes broadly ovate, about 1.5–1.9 mm. long; ovary shortly pilose; style about 1–1.5 mm. long; fruit obovoid to ellipsoid or subglobose, about 8–14 mm. long; seed solitary, about 6–9 mm. long, very smooth and shining, light brown, occasionally somewhat variegated.

TYPE COLLECTION: *Dr. Alexander Garden,* South Carolina, probably near Charleston.

DISTRIBUTION: Dry, often sandy soil; coastal plain, from South Carolina to Florida.

An uncommon but widely distributed form with the pubescence of the leaves merely silvery may be known as **Bumelia tenax** f. **anomala** (Sarg.) comb. nov. (*Bumelia lanuginosa* var. *anomala* Sarg. Jour. Arnold. Arb. 2: 168. 1921; *Bumelia anomala* Clark, Ann. Mo. Bot. Gard. 29: 169. 1942).

9. **Bumelia obtusifolia** Roem. & Schult. Syst. Veg. 4: 802. 1819.

Large, more or less spiny shrub or small tree, up to 15 m. tall; twigs sericeous or sometimes loosely sericeous-tomentose with pale or sometimes

rufous hairs when young, soon glabrate; leaves from oblanceolate to suborbicular, broadly rounded at the apex, gradually or abruptly tapering at the base, commonly 2–5 cm. long and 1–3 cm. wide, sometimes larger, as much as 9 cm. long and 4.5 cm. wide, sericeous or strigose beneath with gray or faintly rufous-tinted hairs when young, later glabrate, obscurely or sometimes more evidently veiny; flowers 1 — numerous in axillary clusters, subsessile or on pedicels up to 8 mm. long; sepals 1.3–3 mm. long, strigose or sericeous with gray hairs; corolla about 2.4–5.4 mm. long, its tube 0.5–2 mm. long; anthers 0.9–2 mm. long; staminodes from narrowly oblong and erose to ovate and subentire, sometimes hooded, about 1.5–3.2 mm. long; style about 1.5–4.6 mm. long; fruit ellipsoid-cylindric to subglobose, about 8–15 mm. long.

TYPE COLLECTION: *Humboldt & Bonpland,* "in ripa fluminis Amazonum, ad confluentem Chinchipen, alt. 200 h. (Prov. Jaen de Bracamoros)", at the north end of the present province of Cajamarca, Peru.

DISTRIBUTION: Southern Mexico to northern Argentina.

LOCAL NAMES: *Has toch, chi cheh chehum, sinan-che, malermo, picurero, picuyú, caimito, piquillin, ivira-nina.*

9A. **Bumelia obtusifolia** subsp. **typica** nom. nov.
Bumelia obtusifolia Roem. & Schult. Syst. Veg. 4: 802. 1819, sens. strict.

Leaves about twice as long as wide, subelliptic to broadly oblanceolate or narrowly obovate; flowers in axillary clusters of about 1–5, the pedicels 2–4 mm. long; corolla 4.7–5.2 mm. long; style about 4 mm. long; staminodes ovate or oblong, subentire, more or less hooded.

DISTRIBUTION: Ecuador and northern Peru.

ECUADOR: Manabí: *Haught 3377,* abundant near the sea, between Salango and Puerto Lopez (NY, US).

9B. **Bumelia obtusifolia** subsp. **buxifolia** (Roem. & Schult.) stat. nov.
Bumelia buxifolia Roem. & Schult. Syst. Veg. 4: 802. 1819.
Bumelia Dunantii A. DC. in DC. Prodr. 8: 191. 1844.
Bumelia Cruegerii Griseb. Fl. Brit. W. Ind. 401. 1861.
Bumelia obtusifolia var. *buxifolia* Miq. in Mart. Fl. Bras. 7: 47. 1863.
Bumelia guatemalensis Standl. Trop. Woods 4: 9. 1925.
Bumelia Grisebachii Pierre in Urb. Symb. Ant. 5: 141. 1904.
Bumelia nicaraguensis Loes. Bot. Jahrb. 60: 367. 1926.
Bumelia conglobata Standl. Trop. Woods 31: 40. 1932.
Bumelia mayana Standl. Trop. Woods 31: 41. 1932.

Leaves mostly 1–2 times as long as wide, broadly elliptic to obovate or suborbicular; petioles generally conspicuously exceeding the pedicels; flowers more or less numerous in dense clusters; corolla about 2.4–5.4 mm. long; style about 1.5–4 mm. long; staminodes ovate, subentire, scarcely or not at all hooded.

TYPE COLLECTION: *Humboldt & Bonpland,* Cumaná, Sucre, Venezuela (NY—photo).

DISTRIBUTION: Tabasco, Mexico, to Nicaragua; northern Colombia and Venezuela to Trinidad, chiefly near the coast.

MEXICO: Tabasco: *Matuda 3034* (A, Mich). Campeche: *Lundell 1277* (A, F, G, Mich, Mo, NY, US); *Stewart 130* (G). Yucatán: *Gaumer 473* (A, F, Mich, Mo, NY, US); *Gaumer 1572* (F); *Gaumer 1791* (A, F, G, Mo, NY, US); *Gaumer 23238* (A, F, G, Mo, NY, US); *Gaumer 23845* (F, G, Mo, NY, US); *Lundell 7501* (A); *Schott 341* (F, US); *Schott 341A* (F); *Schott 341B* (F); *Seler 4937* (G, US); *Steere 1674* (Mich); *Stewart 258* (G). Quintana Roo: *Lundell 7717* (A); *Steere 2399*

(F, Mich). GUATEMALA: El Petén: *Bartlett 12290* (A, F, G, Mich, NY, US); *Bartlett 12593* (A, NY, F); *Bartlett 12739* (A, Mich, NY, US); *Lundell 2201* (Mich). Baja Verapaz: *Kellerman 6588* (F). Zacapa: *Steyermark 29363* (F). BRITISH HONDURAS: *Bartlett 13099* (Mich). HONDURAS: Comayagua: *Edwards 559* (A, F, US). Tegucigalpa: *Dyer 268* (US). NICARAGUA: *Wright s.n.* (G, US). Matagalpa: *Rothschuhe 463* (F — photo & fragment, G — photo, NY — photo). COLOMBIA: Magdalena: *Herbert Smith 2740* (A, G, NY); *Herbert Smith 2071* (A, G, NY, US). VENEZUELA: *Curran & Haman 810* (G, NY); *Curran & Haman 910* (A, G, NY, US); *Curran & Haman 1266* (G, US); *Tamayo 771* (US); *Tamayo 2083* (US). Zulia: *Curran & Haman 759* (G). Falcón: *Curran & Haman 564* (G, NY, US). Carabobo: *d'Heguert 861* (NY). Federal District: *Pittier 7765* (G, US); *Pittier 9206* (G, NY, US); *Pittier 12432* (A, NY, US); *Pittier 13386* (A, NY, US); *Pittier 13479* (US); *Rose 21830* (US); *Tamayo 1139* (US). Sucre: *Bond, Gillin & Brown 44* (NY); *Broadway 107* (G, NY, US); *Broadway 213* (G, NY, US); *Broadway 613* (G, NY, US); *Broadway 651* (G, NY, US); *Johnston 273* (G). TRINIDAD: *Britton & Bailey 2240* (G, NY, US); *Britton & Broadway 2633* (G, NY, US); *Britton & Hazen 817* (G, NY, US), *1725* (G, NY, US); *Britton et al. 2696* (NY, US); *Broadway 8085* (A); *Hart 2196* (NY, US).

9C. **Bumelia obtusifolia** subsp. **excelsa** (A. DC.) stat. nov.

Bumelia sartorum Mart. Herb. Fl. Bras. 233. 1837–40.
Bumelia rhamnoides Casar. Nov. Stirp. Bras. Dec. 64. 1843.
Bumelia excelsa A. DC. in DC. Prodr. 8: 192. 1844.
Bumelia obtusifolia var. *excelsa* Miq. in Mart. Fl. Bras. 7: 48. 1863.
Bumelia fragrans Ridley, Jour. Linn. Soc. 27: 43. 1890.

Leaves mostly 1.5–3.5 times as long as wide, oblanceolate to elliptic or narrowly obovate; petioles scarcely if at all exceeding the pedicels; flowers in loose clusters of about 1–10; corolla about 3.3–4.7 mm. long, its tube only 0.6–1.5 mm. long; staminodes narrowly oblong to lance-ovate, erose, not hooded.

TYPE COLLECTION: *Blanchet 2162*, "in maritimis ca. Bahiam," Brazil.

DISTRIBUTION: Piauhy, Pernambuco, and Fernando do Noronha Island, Brazil, south to Rio de Janeiro, and inland to Paraguay, northern Argentina, and southern Bolivia.

BRAZIL: *Riedel 19* (US). Piauhy: *Luetzelburg 1643* (NY). Fernando do Noronha Island: *Ridley, Lea & Ramage 97* (G). Pernambuco: *Pickel 3386* (A, G). Bahia: *Blanchet 2763* (NY). Rio de Janeiro: *Glaziou 11159* (NY, US), *18439* (A, NY); *Riedel 543* (US). PARAGUAY: *Fiebrig 5392* (US); *Hassler 2153* (G), *7200* (A), *7250* (G), *11507* (A), *11811* (A, G, US), *12286* (A, G, US); *Kuntze s.n.* (in 1892) (NY); *Malme 1032* (G, NY, US). ARGENTINA: Jujuy: *Eyerdam & Beetle 22547* (G), *22548* (G); *Lillo 10792* (G), *10838* (G). Salta: *Eyerdam & Beetle 22896* (G), *22929* (G); *Parodi 9219* (G); *Rodriguez 54* (G); *Rodriguez 1129* (NY); *West 6147* (G). Tucumán: *Lillo 7208* (G); *Venturi 1059* (G, US); *Venturi 1530* (A, US); *Venturi 7588* (US). Formosa: *Jorgensen 2154* (G). Chaco: *Jorgensen 1954* (G, US); *Venturi 9768* (A, G, US). Corrientes: *Parodi 11922* (G). BOLIVIA (Southern): *Pflanz 693* (G).

The northern and southern phases of subsp. *buxifolia* show different trends of variation, but many individuals are quite indistinguishable in the herbarium. The more northern plants have a short style (1.5–3 mm.), often have relatively large leaves (to 9 × 4.5 cm.), and tend to have narrowly ellipsoid fruit. The southern ones have a longer style (to 4 mm.), seldom have the leaves over 5 cm. long, tend to have broader often subglobose fruit, and sometimes have the lateral lobes of the corolla-lobes conspicuously reduced or even obsolete. In spite of the apparent geographi-

cal disjunction of more than 600 miles, taxonomic segregation seems unwise until more stable distinguishing features are found.

Subspecies *excelsa* differs from ssp. *buxifolia* in an imposing array of features, none of which is quite constant. In addition to the characters given in the description, it frequently has the leaves more persistently pubescent beneath than does ssp. *buxifolia*, with hairs that may be slightly rufous-tinted, and tends to have a more nearly rotate, less campanulate corolla.

I have not seen the type of *B. obtusifolia*, but from the description and locality I think it should be associated with a single collection from Ecuador, which has narrow leaves and few flowers, like ssp. *excelsa*, but short pedicels and ovate entire staminodia like ssp. *buxifolia*. The Ecuadorean specimen also differs from both ssp. *buxifolia* and ssp. *excelsa* in having the staminodia more or less hooded. The flowers of *B. obtusifolia* were originally described as white, but, although collectors' notes for ssp. *buxifolia* and ssp. *excelsa* indicate white or greenish flowers, it is uncertain whether the color was noted by Humboldt in the field, or merely taken from the dried specimen by Kunth. The Ecuadorean specimen was noted by the collector to have yellow flowers; it is not known whether or not this color difference is significant.

10. **Bumelia rotundifolia** Sw. Prodr. Veg. Ind. Occ. 50. 1788.
Achras rotundifolia Poir. in Lam. Encyc. Meth. 6: 534. 1804.
Bumelia Purdiaei Urb. Symb. Ant. 5: 143. 1904.
Bumelia clarendonensis Urb. Rep. Sp. Nov. 13: 470. 1915.
Bumelia clarendonensis Urb. Rep. Sp. Nov. 21: 67. 1925, not 1915.
Bumelia peckhamensis Urb. Rep. Sp. Nov. 22: 93. 1925.

Small unarmed tree about 4–9 m. tall, essentially glabrous from the first, or the young twigs occasionally with some appressed evanescent white hairs; leaves firm, suborbicular or broadly elliptic to occasionally obovate, about 1.5–7.5 cm. long and 1–5 cm. wide, alternate or opposite, evidently veiny when young, less so with advancing age, often becoming very obscurely so, borne on short petioles about 3–7 mm. long; flowers in axillary clusters of about 3–12, the pedicels mostly 3–6 mm. long, glabrous; sepals glabrous, about 1–2.5 mm. long, firmly erect and becoming cartilaginous at the base, restricting the lateral growth of the base of the fruit; corolla about 3.2–3.9 mm. long; anthers 1.2–1.5 mm. long; staminodes about 1.5–1.8 mm. long; style about 2–3 mm. long; mature fruit unknown, but maturing fruit ellipsoid, about 7 mm. long.

TYPE COLLECTION: *Swartz*, Jamaica.

DISTRIBUTION: Jamaica.

JAMAICA: *Britton 2824* (NY), *3067* (NY); *Britton & Hollick 1865* (NY), *2220* (NY); *Harris 6169* (NY), *10035* (NY), *10165* (NY, US), *10386* (NY, US), *11040* (NY), *11111* (NY); *Purdie s.n.* (G, NY).

This species is related to *B. obtusifolia*, from which it differs in being essentially glabrous from the first, with the leaves becoming very firm, and in its distribution. The only other species of *Bumelia* that occurs on Jamaica is *B. retusa*, from which the present species likewise differs in being glabrous, with broader leaves that rarely taper to the base. One specimen

(*Walsingham s.n.* — NY) seems intermediate between *B. rotundifolia* and *B. retusa*, and may be a hybrid.

11. **Bumelia retusa** Sw. Prodr. Veg. Ind. Occ. 49. 1788.

Shrub or small tree about 1–6 m. tall, ordinarily nearly or quite unarmed; young twigs sericeous-strigose with rufous hairs which may later turn pale; leaves alternate or opposite, narrowly to broadly obovate or occasionally suborbicular, narrowed at the base, broadly rounded at the apex, mostly 1.5–5 (rarely 7) cm. long and 7–40 mm. wide, rather obscurely or scarcely reticulate, densely and finely sericeous-strigose with rufous hairs on both sides when young, very soon glabrate above, tardily so below, the hairs often turning pale before falling; petioles about 2–8 mm. long; flowers in axillary clusters of about 1–10, the pedicels 2–13 mm. long, sericeous-strigose with rufous hairs that eventually fade; sepals rufous-strigose, about 1.5–3.3 mm. long; corolla about 3.3–5.5 mm. long, the tube 1–2 mm. long; anthers 0.8–1.7 mm. long; staminodes ovate or lanceolate to rotund, erose or subentire, about 1.3–2.8 mm. long; style about 0.7–4.6 mm. long; fruit black, broadly ellipsoid or subglobose, about 6–12 mm. long.

TYPE COLLECTION: None given; stated to come from Jamaica.

DISTRIBUTION: Bahama Islands; Navassa Island; Jamaica; Santa Clara and Pinar del Río, Cuba; southern Vera Cruz to Yucatán and British Honduras. Chiefly or entirely in coastal areas.

11A. **Bumelia retusa** subsp. **typica** nom. nov.

Bumelia retusa Sw. Prodr. Veg. Ind. Occ. 49. 1788, sens. strict.
Achras retusa Poir. in Lam. Encyc. 6: 533. 1804.
Bumelia retusa var. *loranthifolia* Pierre in Urb. Symb. Ant. 5: 145. 1904.
Bumelia loranthifolia Britt. Bull. N.Y. Bot. Gard. 3: 447. 1905.
Bumelia bahamensis Britt. loc. cit.
Bumelia oblongata Urb. Symb. Ant. 6: 31. 1909.
Bumelia excisa Urb. Rep. Sp. Nov. 13: 471. 1915.
Bumelia Roigii Britt. & Small, Bull. Torrey Club 53: 461. 1926.
Bumelia navassana Urb. & Ekm. Ark. Bot. **22A**(17): 71. 1929.

Flowers relatively small, the corolla mostly 3.3–4.5 mm. long, the anthers about 0.8–1.3 mm., the staminodes about 1.3–2 mm. long, the style about 0.8–3.3 mm. long. Bahamas, Cuba, Navassa, and Jamaica.

BAHAMAS: Abaco: *Brace 1565* (NY); *Brace 1543* (NY). Acklin's Island: *Brace 4366* (G, NY, US); *Brace 4476* (F); *Eggers 3924* (US). Andros: *Brace 5034* (NY); *Brace 5151* (NY); *Brace 5264* (NY); *Brace 5311* (NY); *Brace 5323* (NY); *Northrop 544* (A, F); *Small & Carter 8545* (G, NY, US); *Small & Carter 8612* (G, NY, US). Anguilla Isles: *Wilson 7955* (Mo, NY). Atwood Cay: *Wilson 7396* (G, NY). Berry Islands: *Britton & Millspaugh 2243* (NY). Caicos Group: *Millspaugh 9223* (G, NY). Cat Island: *Britton & Millspaugh 5964* (F, NY); *Wilson 7164* (G, NY). Crooked Island: *Brace 4600* (NY, US); *Brace 4698* (NY); *Rothrock 246* (F). Eleuthera: *Britton 6416* (NY); *Britton & Millspaugh 5412* (NY); *Britton & Millspaugh 5426* (F, NY); *Britton & Millspaugh 5433* (NY, F). Exuma Chain: *Britton & Millspaugh 2780* (NY); *Wilson 7894* (NY). Great Bahama: *Britton & Millspaugh 2565* (NY). Great Exuma: *Britton & Millspaugh s.n.* (NY). Great Ragged Island: *Wilson 7818* (G, NY); *Wilson 7864* (G, NY). Inagua: *Nash & Taylor 975* (NY); *Nash & Taylor 1282* (NY); *Nash & Taylor 1294* (NY). Little San Salvador: *Britton & Millspaugh 5664* (F, NY). Long Cay: *Brace 4071* (NY). Long Island: *Britton & Millspaugh 6301* (F, NY). Mariguana: *Wilson 7463* (G, NY). New Providence: *Britton 44* (NY); *Britton 88* (NY); *Britton & Brace 283* (G, NY, US); *Britton*

& Brace 290 (NY, US); *Britton & Brace 295* (NY, US); *Britton & Brace 315* (NY); *Britton & Brace 351* (NY, US); *Britton & Brace 538* (G, Mo, NY, US); *Curtiss 85* (A, G, Mo, NY, US); *Wilson 8175* (NY); *Wilson 8196* (NY); *Wilson 8225* (NY); *Wilson 8349* (NY). North Bimini: *Brace 3475* (NY). Rose Island: *Britton & Millspaugh 2131* (G, NY, US). Rum Cay: *Brace 3946* (NY). St. George's Cay: *Coker 315* (NY). Turk's Islands: *Millspaugh 9363* (G, NY). Watling's Island: *Britton & Millspaugh 6168* (F, NY); *Rothrock 295* (F, NY); *Wilson 7240* (G, NY); *Wilson 7261* (G, NY). CUBA: Pinar del Río: *Roig 3256* (Cu, NY, US); *Roig 3257* (NY). Habana: *Acuña 10942* (Cu). Santa Clara: *Ekman 18560* (A, F, G, Mo, NY, US). NAVASSA ISLAND: *Ekman 10811* (US). JAMAICA: *Britton 1153* (NY, US); *Britton 1244* (NY); *Britton 2544* (NY); *Harris 9729* (NY, US); *Harris 9734* (NY, US); *Harris 10380* (NY, US).

11B. **Bumelia retusa** subsp. **neglecta** subsp. nov.

A subsp. *typica* differt floribus majoribus, corolla 4.3–5.5 mm. longa, antheris 1.4–1.7 mm. longis, staminodiis 2.5–2.8 mm. longis, stylo 3.3–4.6 mm. longo.

TYPE: *Schipp 585,* open places at edge of mangroves, 5 feet elevation, All Pines, British Honduras, August 20, 1930 (F); isotypes, A, G, Mich, Mo, NY.

DISTRIBUTION: Along the coast from southern Vera Cruz to Yucatán and British Honduras.

MEXICO: Vera Cruz: *Charles L. Smith 1123,* Coatzacoalcos (US). Yucatán: *Gaumer 23210,* Yaxactun (Mo, US), *23338,* Mina de Oro (A, F, G, Mo, NY, US); *Goldman 594,* Progreso (US); *Lundell 7392,* Progreso (A); *Schott 313,* Progreso (F, Mo, US), *313a,* Celestun (F). Quintana Roo: *Gaumer 131,* Cozumel Island (G), *s.n.,* in 1836, Mugeres Island (US).

A few specimens of *B. retusa* from the Bahama Islands have very spiny twigs with reduced less than usually hairy leaves under 1 cm. long, thus seemingly approaching *B. glomerata.* They pass into the more typical forms of the species, however, and in one case the collector noted that they are young twigs from an otherwise apparently not unusual plant. Hybridity seems out of the question, since the only other species of *Bumelia* known to occur in the Bahamas is *B. celestrina,* which these plants do not resemble.

Urban and Ekman differentiated *B. navassana* from *B. retusa* by its opposite instead of alternate leaves, but it may be noted that the original description of *B. retusa* called for opposite leaves. The leaves may in fact be either alternate or opposite, even on the same plant. *B. Roigii* was described as having a relatively large fruit 1.5 cm. in diameter, but the fruit on the type may be abnormal, and those on the isotypes are smaller.

12. **Bumelia socorrensis** Brandegee, Zoe 5: 106. 1901.

Tree up to 25 m. tall, apparently unarmed except for sometimes a few short axillary spines; twigs finely sericeous-strigose with rufous hairs when young, soon glabrate; leaves broadly oblanceolate, about 4–8 cm. long and 1.5–3.5 cm. wide, tapering to the base, broadly rounded at the apex, finely rufous-strigose on both sides when young, later more or less glabrate, evidently reticulate at least beneath, but the veins not much raised, the primary lateral ones about 8–15 pairs, not always sharply separable from the larger secondary ones; petioles about 5–10 mm. long; flowers in axillary clusters of about 1–5, appearing short and bulky, the pedicels rufous-sericeous, about 1–4 mm. long; sepals more or less rufous-hairy.

about 2.3–3.5 mm. long; corolla about 4–5 mm. long, the tube thick, 1.5–2 mm. long, the lobes much thinner; staminodes about 2.5–3 mm. long; filaments coarse, the anthers only about 1.1–1.4 mm. long; ovary slightly 5-lobed, brown-hairy, its style about 2.8–4 mm. long; fruit reputedly ellipsoid, 12–14 mm. long and 8 mm. thick, dark blue.

TYPE COLLECTION: *Anthony s.n.*, Socorro Island, Mexico (G).

DISTRIBUTION: Socorro Island.

MEXICO: Socorro Island: *Barkelew 190* (A, G, Mo, NY, US); *Mason 1638* (A, G, US); *Solis 82* (US).

This species, while sharply distinct, seems to be allied to *B. persimilis* on the one hand and *B. peninsularis* on the other. It differs from the former in its characteristically oblanceolate broadly rounded leaves with fine appressed rufous pubescence, and in its somewhat smaller fruit. It differs from *B. peninsularis* in its larger size, larger more oblanceolate leaves with finer pubescence, and in its smaller flowers, particularly its smaller anthers. *B. socorrensis* is of course geographically remote from all others of the genus.

13. **Bumelia peninsularis** Brandegee, Zoe 5: 107. 1901.

Shrub 3–4 m. tall, much branched from the base, provided with short axillary spines; twigs pubescent with appressed rufous hairs when young, later glabrate; leaves elliptic, elliptic-ovate, or elliptic-oblong, about 2.5–4.5 cm. long and 1–2.5 cm. wide, broadly rounded at the apex, firm, evidently or obscurely reticulate, pubescent beneath, especially along the midrib, with coarse, conspicuously malpighian, appressed rufous hairs, at least a few of which commonly persist until maturity; petioles about 3–8 mm. long; flowers about 2–6 in axillary clusters, the pedicels nearly or quite glabrous, 4–8 mm. long; sepals about 4.2–5 mm. long, glabrous or nearly so, of the same texture throughout; corolla about 7.5 mm. long, its tube 2.3 mm. long; staminodes about 3.5 mm. long; anthers about 2.5–2.7 mm. long, slightly exserted; ovary short-hairy or reputedly glabrous, its style about 7 mm. long; fruit broadly ellipsoid, about 15 mm. long.

TYPE COLLECTION: *Brandegee s.n.*, Sierra de la Laguna, Cape Region, Baja California, Mexico, March 1892 (G, US).

DISTRIBUTION: Baja California, Mexico.

MEXICO: Baja California: *Brandegee s.n.*, in 1894 (US); *Purpus 261*, San Felipe, Cape Region, March, 1901 (Mo, US).

14. **Bumelia cartilaginea** sp. nov.

Frutex vel arbor parva usque ad 10 m. alta spinis brevibus axillaribus praedita, ramulis juvenilibus subtiliter rufo-sericeo-strigosis cito glabratis; foliis firmiter chartaceis ellipticis vel anguste obovato-ellipticis, vulgo 1.5–4.5 cm. longis et 8–22 mm. latis, apice late rotundatis vel subacutis, obscure vel perspicue reticulatis, subtus praecipue secus costam pilis adpressis rufis valde decidue strigosis (pilis paucis ad maturitatem persistentibus); petiolis 2–5 mm. longis; floribus in glomerulis axillaribus 1–6, pedicellis 2–5 mm. longis glabris vel glabratis; sepalis circiter 3–3.5 mm. longis, glabris vel pilis paucis rufis ornatis, parte basali acute circumscripta et cartilaginea, parte distali membranaceo-chartacea; corolla circiter 4.5–5 mm. longa, tubo 1.5–1.8 mm. longo, lobis suberectis; staminodiis 1.5–2 mm.

longis glabris eroso-laciniatis plus minusve cucullatis, inferne carinatis, superne complanatis plus minusve inflexis; antheris circiter 1.6–1.7 mm. longis; ovario glabro, stylo 3.7–5.2 mm. longo; fructu ignoto.

TYPE: *Salazar 857,* San Ignacio, Sinaloa, Mexico, 460 m., June 3, 1919, (US 1014209). What is evidently an isotype, also at US, bears the additional data *Montes* and *Salazar,* Arroyo del Palmar La Caña, shrub 3–4 m. high in moist shady places.

DISTRIBUTION: Sinaloa to Guerrero, Mexico.

MEXICO: Sinaloa: *Ortega 857,* La Caña, San Ignacio, in 1922 (F). Michoacán or Guerrero: *Langlassé 995,* Cuesta del Peregrino, terrain granitique, 500 m., April 15, 1899 (G). Guerrero: *Haenke 1594,* Acapulco (F, NY).

Bumelia cartilaginea has been confused with *B. peninsularis,* which has the flowers larger in all parts, with the sepals of the same texture throughout, and the staminodia not hooded. It is in some respects transitional between *B. peninsularis* and *B. verruculosa,* but it differs from the latter in its glabrous and less strongly hooded staminodia, which are erose-laciniate instead of entire-margined, in its suberect sepals and corolla-lobes, and in its soon glabrate not at all verrucose twigs. The known ranges of these three species are all quite distinct. An approach to the cartilaginous-based type of sepal so conspicuous in *B. cartilaginea* may sometimes be seen in *B. persimilis* and *B. socorrensis.* It should be pointed out that the bases of the sepals do not become evidently cartilaginous until the flowers have opened; maturing buds have the sepals apparently of the same texture throughout.

15. **Bumelia verruculosa** sp. nov.

Frutex spinosus, ramulis primo rufo-tomentosis demum basibus papillatis pilorum delapsorum verruculosis; foliis lanceolato-ellipticis vel elliptico-oblongis, circiter 2.5–5 cm. longis et 1–2 cm. latis, perspicue vel obscure reticulatis, apice obtusis vel late rotundatis, primo subtus praecipue secus costam pilis adpressis rufis strigosis mox glabratis; petiolis 2–5 mm. longis; floribus in glomerulis axillaribus circiter 3–6, pedicellis glabris vel subglabris 3–6 mm. longis; sepalis circiter 2.7–3 mm. longis, glabris vel pilis paucis rufis ornatis, parte basali firma et cartilaginea, parte terminali membranaceo-chartacea reflexa; corolla circiter 4.8–5 mm. longa, tubo 1–1.2 mm. longo, lobis reflexis; staminodiis cucullatis inflexis integris villosis circiter 1.7–2 mm. longis; antheris 1.8–2 mm. longis; ovario glabro, stylo 4–4.5 mm. longo; fructu ignoto.

TYPE: *Pringle 6984,* limestone hills, Las Palmas, near Tampico, San Luis Potosí, Mexico, March 7, 1899, 400 feet (US 1638968); isotypes at G, NY, US.

DISTRIBUTION: Known only from the type collection, San Luis Potosí, Mexico.

This species is superficially similar to *B. peninsularis* and *B. cartilaginea,* but it differs strikingly in its hooded, villous, entire-margined, inflexed staminodia, and in the persistent bases of the hairs of the twigs. It also differs in its strongly reflexed sepals and corolla-lobes, and in its known geographic distribution. Both the staminodes and the pubescence of the twigs are quite unique in the genus.

16. **Bumelia obovata** (Lam.) A. DC. in DC. Prodr. 8: 191. 1844.

Shrub or small tree commonly 2–6 m. tall, unarmed or sometimes

strongly spiny; young twigs sericeous-strigose with rufous hairs, generally soon glabrate; leaves oblanceolate to broadly ovate or suborbicular, broadly rounded and sometimes obscurely wavy at the apex, cuneate at the base, commonly 1–3.5 cm. long and 3–33 mm. wide, occasionally some of them smaller, rufous-strigose beneath when young, sooner or later subglabrate, the hairs often fading before falling; leaf-surfaces, especially the upper, having a peculiar texture due largely to the fine slightly raised irregularly reticulate striations trending parallel to the primary lateral veins, not otherwise reticulate; flowers mostly about 2–10 in axillary clusters, from subsessile to borne on pedicels as much as 10 mm. long, the pedicels rufous-strigose to glabrous; sepals glabrous or more or less strigose, about 1.2–2 mm. long; corolla about 2.7–4.3 mm. long, the tube 0.7–1.3 mm. long; anthers 0.8–1.3 mm. long; ovary hairy or subglabrous; style about 2–4.5 mm. long; fruit subglobose to sometimes ellipsoid-cylindric, black, 5–12 mm. long.

TYPE COLLECTION: None given.

DISTRIBUTION: Hispaniola and Puerto Rico through the Lesser Antilles to Curaçao and Aruba, also rarely in northern Venezuela.

16A. **Bumelia obovata** var. **typica** nom. nov.

Sideroxylon obovatum Lam. Tab. Encyc. 2: 42. 1793.
Bumelia cuneata Sw. Fl. Ind. Occ. 1: 496. 1797.
Achras cuneifolia Poir. in Lam. Encyc. Meth. 6: 534. 1804.
Sideroxylon cuneatum A. DC. in DC. Prodr. 8: 181. 1844.
Bumelia parvifolia A. DC. in DC. Prodr. 8: 190. 1844.
Bumelia obovata A. DC. in DC. Prodr. 8: 191. 1844, sens. strict.
Bumelia myrsinifolia A. DC. in DC. Prodr. 8: 192. 1844.
Bumelia obovata var. *portoricensis* Pierre in Urb. Symb. Ant. 5: 143. 1904.
Bumelia obovata var. *thomensis* Pierre, loc. cit.
Bumelia heterophylla Urb. Symb. Ant. 7: 326. 1912.

Usually essentially unarmed, only occasionally evidently spiny; pedicels mostly 2–10 mm. long, sparsely hairy or glabrous; sepals and ovary sparsely hairy or glabrous; style sometimes as much as 4.5 mm. long, often much less. Range of the species.

HAITI: *Ekman H3274* (US); *Nash & Taylor 1595* (NY, US). DOMINICAN REPUBLIC: *Bertero s.n.* (Mo, NY — fragment); *Ekman 14067* (US); *Fairchild 2622* (A, US); *Taylor 519* (NY). PUERTO RICO: *Britton 9106* (NY), *9648* (NY); *Britton & Brown 6025* (NY); *Britton, Cowell & Brown 4821* (NY, US), *4879* (G, Mo, NY, US); *Britton, Cowell & Hess 1657* (NY, US); *Britton & Shafer 1878* (NY, US); *Gregory 306* (NY), *408* (PR); *Hess 1668* (NY); *Miller 1631* (US); *Shafer 1998* (NY, US); *Sintenis 3400* (G, US), *3485* (Mo, NY, US), *3546* (US), *3780* (G, US), *4814b* (US). ST. THOMAS: *Britton 192* (NY); *Britton & Shafer 18* (NY, US); *Eggers 409* (G), *s.n.* (Mo, NY, US); *Holton s.n.* (NY); *Rose 3196* (NY). ST. JAN: *Britton & Shafer 526* (NY, US). TORTOLA: *Fishlock 136* (NY), *446* (NY, US), *447* (F); *Britton & Shafer 905* (NY, US). VIRGIN GORDA: *Beard 328* (A); *Britton & Fishlock 1116* (NY, US). ANEGADA: *Britton & Fishlock 960* (G, NY, US); *Fishlock 10* (F, G, NY, US). ST. CROIX: *Ricksecker 383* (G, Mo, NY, US). ST. MARTIN: *Boldingh 2765* (NY). ST. BARTHOLOMEW: *Forsstroem s.n.* (NY). BARBUDA: *Box 617* (US). ANTIGUA: *Box 847* (US), *1401* (A, US), *1511* (A, US). GUADELOUPE: *Bertero s.n.* (Mo); *Duss 2909* (NY). MARTINIQUE: *Duss 260* (NY). CURAÇAO: *Boldingh 5312* (NY); *Britton & Shafer 3109* (NY, US); *Curran & Haman 88* (G, NY), *158* (A, G, US), *205* (G, NY, US); *Potter 5118* (NY); *Realino s.n.* (Krukoff Herb.). ARUBA: *Boldingh 6494* (NY); *Curran & Haman 410* (G, US). BONAIRE: *Boldingh 7235* (NY), *7422* (NY). VENEZUELA: Aragua: Ocumare de la Costa, *Williams 12174* (US). Sucre: Paria Peninsula, *Bond, Gillin & Brown 262* (NY).

16B. **Bumelia obovata** var. **Krugii** (Pierre) comb. nov.
Bumelia Krugii Pierre in Urb. Symb. Ant. 5: 146. 1904.

Strongly spiny; more hairy than var. *typica,* the twigs, pedicels, and sepals finely sericeous-strigose with rufous hairs; leaves averaging smaller than in var. *typica;* flowers subsessile, the pedicels up to about 2 mm. long; ovary uniformly short-hairy; style apparently not over 3 mm. long. Puerto Rico.

TYPE COLLECTION: Not specified, from among *Sintenis 3472, 3473,* and *4813b,* "in Portorico prope Guanica in fruticetis litoralibus ad Salinas."

PUERTO RICO: *Britton 9115* (NY), *9327* (NY), *9996* (NY); *Britton & Boynton 8295* (NY, US); *Britton & Cowell 1298* (NY); *Britton, Cowell & Brown 4897* (US), *4905* (Mo, NY, US); *Britton & Shafer 1837* (Mo, NY, US), *1908* (NY, US); *Gregory 650* (PR); *Shafer 2940* (NY, US); *Sintenis 3472* (Mo, NY), *3473* (G, US).

Bumelia obovata may be distinguished from all others of the genus by the peculiar leaf-texture, a character which, although perhaps more readily observed than described, is as nearly constant as any in the genus. It is presumably related to *B. obtusifolia.* Except at the borders of its range, in Hispaniola and Venezuela, no other species of *Bumelia* is known to occur in its area.

The variety *Krugii* is well separated from the ordinary nearly or quite unarmed forms of var. *typica.* However, several otherwise representative specimens of the latter from Hispaniola, one from Puerto Rico, one from Curaçao, and one of the two known collections from Venezuela resemble var. *Krugii* in being more or less spiny. Most of these specimens, it will be noted, come from outside the known range of var. *Krugii.* It is possible that a third variety could be established for these plants, but in view of their very spotty distribution I am reluctant to do so without further evidence. It seems not improbable that the type of the species is of this nature, since it was originally described by Lamarck as being spiny.

17. **Bumelia glomerata** Griseb. Mem. Am. Acad. II. 8: 518. 1862.
Bumelia horrida Griseb. Cat. Pl. Cub. 165. 1866.
Bumelia microphylla Griseb. Cat. Pl. Cub. 165. 1866.
Bumelia tortuosa C. Wright ex Sauvalle, Ann. Acad. Habana 6: 288. 1870.
?Bumelia subintegra Urb. & Ekm. Ark. Bot. **21A**(5): 56. 1927.
Bumelia Buchii Urb. Ark. Bot. **21A**(5): 56. 1927.
Bumelia pachyclada Urb. & Ekm. Ark. Bot. **21A**(5): 57. 1927.
Bumelia lineolata Urb. & Ekm. Ark. Bot. **22A**(17): 73. 1929.

More or less spiny shrub or small tree, sometimes less than 1 m. high, sometimes reaching 12 m.; young twigs finely rufous-strigose; leaves about 3–40 mm. long and 2–17 mm. wide, elliptic or broadly oblanceolate (especially when larger) to broadly obovate or suborbicular (especially when smaller), broadly rounded at the apex, thick and smooth, mostly fascicled, strigose beneath with mostly rufous hairs when young, later glabrate, the veins, except the midrib, generally visible only as faint furrows or not at all; flowers about 1–4 in a cluster, subsessile, the rufous-hairy pedicels up to about 2 mm. long; sepals about 1.1–2.2 mm. long, glabrous or rufous-strigose; corolla about 3.1–3.8 mm. long, the tube 1.2–1.5 mm. long; stamens included, the filaments only about 1 mm. long; anthers about 0.7–1 mm. long; staminodes ovate to reniform, about 1–1.3

mm. long; ovary with flattish to broadly rounded glabrous top and short-hairy to glabrous sides, the style 0.7–1.4 mm. long; fruit dark red, subglobose, less than 1 cm. long.

TYPE COLLECTION: *Wright 347*, eastern Cuba (G, NY).

DISTRIBUTION: Cuba and Haiti.

This species might conceivably be divided into 3 varieties, a typical one, only slightly spiny, with relatively large leaves that have the midrib raised and visible beneath nearly to the tip, one based on *B. horrida*, strongly spiny, with smaller leaves in which the midrib visibly extends scarcely beyond the middle, and an equally spiny but coarser variety based on *B. microphylla*, with very small leaves that have scarcely discernible midrib and tend to become coppery beneath. It is entirely possible, however, that these represent mere individual responses to variations in the severity of the habitat, and I am therefore unwilling to propose the new combinations that would be necessary. The specimens have been annotated as "typical phase," "*B. horrida* phase," and "*B. microphylla* phrase," and are so cited below.

Typical phase: CUBA: Isla de Pinos: *Britton, Britton & Wilson 15072* (NY, US). Pinar del Río: *Ekman 16577* (NY). Oriente: *Ekman 6264* (NY), *7893* (NY), *9624* (A, F, US), *19184* (G, NY, US); *Roig 4910* (Cu), *4992* (NY), *5185* (Cu, NY).

B. horrida phase: CUBA: *Wright 1922* (NY), *2922* (G, Mo, NY, US). Isla de Pinos: *Britton, Britton & Wilson 15377* (NY, US); *Ekman 12335* (US). Pinar del Río: *Britton & Cowell 9924* (NY); *Fors 4762* (Cu); *Roig 3966* (Cu). Habana: *Ekman 13271* (NY); *León 6010* (NY), *6256* (NY), *7172* (NY), *7591* (NY); *León & Roig 11445* (NY); *Wilson 13933* (NY, US). Santa Clara: *Britton, Earle & Wilson 4595* (G, NY, US); *Combs 734* (G, Mo, NY). Camaguey: *Ekman 15478* (US). Oriente: *Britton & Cowell 12705* (NY, US); *Britton, Cowell & Shafer 13064* (NY, US); *Ekman 2961* (US), *10204* (F). HAITI: *Ekman H 10004* (US); *Leonard 13267* (NY).

B. microphylla phase: CUBA: *Wright 2922a* (G, Mo, NY), *3623* (G). Habana: *León & Roig 2522* (Cu), *8150* (Cu). Matanzas: *León & Roig 4167* (Cu), *12950* (NY); *Ekman 16499* (NY), *17181* (US), *18592* (US). Santa Clara: *Ekman 18841* (G, NY). Oriente: *Ekman 19103* (G, NY, US); *Shafer 1234* (NY, US).

Bumelia subintegra Urb. & Ekm. was described as having the pubescence of the twigs spreading, instead of appressed as in *B. glomerata*, and is only doubtfully included here. I have not seen the type.

Bumelia glomerata seems to be related to *B. obovata*, the var. *Krugii* of which tends toward it. The leaves of *B. glomerata*, while differing from those of *B. obovata* in being thick, firm, smooth, and not at all veiny, as well as smaller, frequently show a suggestion of the fine raised striations so characteristic of the latter species. It is possible, however, that the relationship of *B. glomerata* is with *B. retusa* instead of with *B. obovata*, and occasional forms of *B. retusa* with spiny twigs and very small leaves are indeed difficult to distinguish from *B. glomerata*.

18. **Bumelia occidentalis** Hemsl. Biol. Centr. Am. Bot. 2: 298. 1881.
Bumelia fragrans Brandegee, Zoe 5: 106. 1901, not Ridley (1890).
Bumelia Brandegei Blake, Contr. Gray Herb. n.s. 52: 76. 1917.
Bumelia cuneifolia Jones, Contr. West. Bot. 18: 63. 1933–35.

Branching spiny shrub or small tree commonly 2–5 m. tall; leaves oblanceolate to obovate, elliptic-obovate, or rarely subrotund, tapering to the base, broadly rounded at the apex, about 8–30 mm. long and 2–20 mm. wide, scarcely or obscurely veiny, finely gray-puberulent especially beneath, eventually more or less glabrate; flowers several in axillary clusters, the pedicels about 4–20 mm. long, commonly appressed-puberulent like the leaves; sepals about 2.3–3.5 mm. long, grayish-puberulent or strigose; corolla about 4.5–5.2 mm. long, its tube 0.8–1.5 mm. long; anthers about 1.3–2.6 mm. long; style about 4.5–5.2 mm. long; fruit ellipsoid-oblong, blue-black, about 12–16 mm. long.

TYPE COLLECTION: *Coulter 934,* upper Sonora, Mexico.

LOCAL NAME: *Bebelama.*

DISTRIBUTION: Baja California and Sonora, Mexico.

MEXICO: Baja California: *Brandegee s.n.* (April 9, 1889), San José de la Gracia (G, US); *Brandegee s.n.* (in 1893), Pescadero (A); *Brandegee s.n.* (May 7, 1897), San José del Cabo (G, US); *Gentry 4264,* Los Encinos, Sierra Giganta (G, Mo); *Johnston 3904,* Agua Verde Bay (A, G, Mo, NY, US); *Mason 1866,* Cape San Lucas (G, US); *Nelson & Goldman 7245,* near El Potrero (F, US); *Purpus 319,* Las Animas (Cape Region) (Mo, US); *Wiggins 5482,* north of Comondu (A). Sonora: *Coville 1676,* Torres (US); *Ferris 8729,* San Carlos Bay, north of Guaymas (NY, US); *Johnston 4296,* San Pedro Bay (A, G, NY, US); *Johnston 4367,* San Carlos Bay (G, US); *MacDougal & Shreve 6,* west of Ceruas Well (US); *Shreve 6054,* near Santa Rosa (F); *Shreve 6195,* north of Palma, between Guaymas and Hermosillo (US); *White 416,* Tonibabi hot springs, near Moctezuma (G); *Wiggins 6167,* between San Carlos and Santa Rosa, 45 miles west of Norio (US); *Wiggins 6482,* 63 miles north of Guaymas (Mich, US); *Wiggins 8293,* San Pedro, north of Tajitos (US).

This species is related to *B. celastrina,* from which it differs in its more copious and more persistent pubescence, longer pedicels, larger flowers with longer style and anthers, larger fruit, and more western disjunct distribution. *Bumelia fragrans* Brandegee (= *B. Brandegei* Blake), with shorter, less hairy pedicels, and broader sooner glabrate leaves than usual, is surely part of this species. Further collecting may conceivably warrant its varietal recognition; the specimens now available do not.

19. **Bumelia celastrina** H.B.K. Nov. Gen. et Sp. 7: 212. 1825.
Bumelia ferox Schlecht. & Cham. Linnaea 6: 392. 1831.
Bumelia spinosa A. DC. in DC. Prodr. 8: 191. 1844.
Bumelia angustifolia Nutt. N. Am. Sylva 3: 38. 1849.
Bumelia Eggersii Pierre in Urb. Symb. Ant. 5: 146. 1904.
Bumelia Schottii Britton, N. Am. Trees 777. 1908.
Bumelia affinis Blake, Contr. Gray Herb. n.s. 53: 45. 1918.

Shrub or small tree commonly 2–9 m. tall; leaves generally fascicled, except on vigorous young shoots, glabrous from the first, or with only a few very fine and inconspicuous white hairs when young, oblanceolate to obovate or sometimes nearly elliptic, broadly rounded at the apex, generally acute at the base, mostly 1–4 cm. long and 3–25 mm. wide, occasionally a little larger, firm, the veins not very prominent, the reticulum rather obscure or indiscernible; flowers about 3–10 in a cluster, the pedicles glabrous or with a few inconspicuous white hairs, about 2–7 mm. long; corolla about 3–4.5 mm. long, the short tube only 0.8–1.2 mm. long; anthers 1–1.5 mm. long; staminodes lance-elliptic to rhombic-ovate, about 2–3 mm. long; ovary pilose toward the base, glabrous above, the style about 2.5–4 mm.

long; fruit ellipsoid-cylindric, occasionally a little widened above, 7–13 mm. long, blue-black.

TYPE COLLECTION: *Humboldt & Bonpland,* "crescit in declivitate occidentali montium Mexicanorum, in convali Sopilote, inter Chilpansingo et Tasco, alt. 517 hex."

LOCAL NAMES: *Hapuche, caimito, coma, bebelamilla bagre.*

DISTRIBUTION: Southern Texas to Venezuela; Florida; Bahama Islands; Camaguey, Cuba.

MEXICO: Nuevo León: *Dodge 96* (NY, US); *Edwards 378* (F); *Gregg 196* (G, Mo); *Kenoyer 1173* (F); *Lozano 13904* (G, Mich, US); *Pringle 2787* (A, G, US); *Taylor 378* (Mo). Tamaulipas: *Bartlett 10565* (F); *Bartlett 10833* (F); *Bartlett 10784* (F, US); *Bartlett 11111* (F, G, US); *Berlandier 3048* (Mo); *LeSueur 340* (F, G). Sinaloa: *Ortega 6572* (US). Vera Cruz: *Müller 1855* (NY); *Seler 3711* (G, US); *Woronow 2099* (F). Oaxaca: *Reko 3677* (US); *Williams 9907* (F). Yucatán: *Flores 6* (F); *Gaumer 1313* (A, F, G, Mich, Mo, NY). Chiapas: *Bossé s.n.* (F); *Matuda 2702* (A, Mich, Mo, NY, US). GUATEMALA: San Marcos: *Steyermark 37776* (F). Progreso: *Standley 69035* (F); *Standley 69042* (A, F); *Steyermark 43859* (F). Zacapa: *Standley 74144* (F); *Standley 72004* (F). Retalhuleu: *Standley 66512* (F); *Standley 66643* (F); *Standley 87545* (F). Chiquimula: *Steyermark 31533* (F). EL SALVADOR: *Standley 20864* (G, NY, US); *Standley 21893* (G, NY, US). PANAMA: Coclé: *Pittier 4988* (G, NY, US). COLOMBIA: Bolívar: *Heriberto 95* (US). Magdalena: *Herbert Smith 423* (A, G, NY, US). VENEZUELA: Isla de San Carlos: *Curran & Haman 802* (G, NY, US). Falcón: *Curran & Haman 534* (A, G, NY, US). BAHAMA ISLANDS: Great Bahama: *Brace 3605* (NY); *Britton & Millspaugh 2737* (NY). New Providence: *Britton 6592* (NY, US); *Britton & Brace 326* (NY); *Eggers 4418* (A, US); *Millspaugh 2492* (NY). Andros: *Brace 4870* (NY); *Brace 5291* (NY); *Brace 6773* (NY); *Coker 202* (NY); *Northrop 666* (F, NY). Hog Island: *Wilson 8317* (Mo, NY). Rose Island: *Britton & Millspaugh 2157* (NY). Cat Cay: *Brace 3740* (NY). South Cat Cay: *Millspaugh 2420* (NY). CUBA: Camaguey: *Ekman 15476* (NY, G, US); *Ekman 15523* (NY); *Shafer 407* (G, NY, US); *Shafer 886* (NY, US); *Shafer 906* (NY, US).

The plants from Florida and the West Indies have the reticulum of the leaf a little more obscure, on the average, than others of the species, and are generally totally glabrous from the first, but the differences are minor and not sufficiently constant to warrant taxonomic recognition. An immature fruiting specimen from Oriente, Cuba (*Roig 5545* — Cu) seems nearest to *B. celastrina,* but has the young twigs evidently rufous-strigose.

20. **Bumelia conferta** (C. Wright) Pierre in Urb. Symb. Ant. 5: 144. 1904.
Sideroxylon confertum C. Wright in Sauvelle, Fl. Cub. 86. 1870.

Unarmed tree, or the young branches spiny; twigs rufous-strigose when young; leaves broadly elliptic, about 2–5 cm. long and 1.5–3.5 cm. wide, rounded or retuse at the apex, rounded or obtuse at the base, essentially glabrous from the first, not at all veiny, the primary lateral veins faint or obscure at maturity; flowers about 1–4 in a cluster, the pedicels glabrous, about 6–10 mm. long; sepals slightly strigose, becoming cartilaginous at the base; corolla (not seen by me) about 4.5 mm. long, the lateral lobes absent or vestigial; ovary short-hairy; style about 3–3.5 mm. long; mature fruit unknown, but a maturing one narrowly ellipsoid, about 9 mm. long.

TYPE COLLECTION: *Wright 2920,* in part, "a la orilla de los manglares Potrero Playitas, Bahia-Hondia," Pinar del Río, Cuba (G, NY, US — drawing). An entirely different plant, also bearing Wright's number *2920,* was made the type of *Daphnopsis cuneata* Radlk. (Mo).

DISTRIBUTION: Pinar del Río and Oriente, Cuba.

CUBA: *Wright 2928* (presumably in Pinar del Río) (G, Mo). Pinar del Río: *Ekman 17405* (US), *17435, Toscano* (Cu, NY, US). Oriente: Sierra Maestra, *Ekman 9389* (A, F, G, NY, US), *14206* (NY); *León 11022* (NY).

Bumelia conferta is closely related to *B. rotundifolia* and, at least in the herbarium, greatly resembles it, but it differs in the obsolescence of the lateral lobes of the corolla-lobes, in the more evidently hairy twigs and sepals, in having fewer flowers per cluster, and in having the leaves, on the average, less veiny. The known distribution of *B. conferta,* Oriente and Pinar del Río, Cuba, is perplexing and unexplained, but the specimens available from the two areas show no appreciable differences.

21. **Bumelia Picardae** Urb. Symb. Ant. 5: 148. 1904.

Spiny shrub about 2–3 m. tall; young twigs strigose with silvery or rufous hairs, very soon glabrate; leaves firm, oblanceolate or more commonly obovate to narrowly or broadly elliptic, obtuse or broadly rounded at the apex, more often narrowed at the base, about 6–30 mm. long and 4–15 mm. wide, silvery-strigose when young, very soon glabrate, the midrib raised beneath, the primary lateral veins visible only as faint furrows, especially beneath, or not at all, the upper surface smoother and shinier than the lower, subsessile, the petioles less than 3 mm. long; flowers about 1–3 in the axils, subsessile, the pedicels less than 2 mm. long; sepals about 1.5–2.9 mm. long, glabrous, generally green, especially toward the base; corolla about 3.2–4 mm. long, the tube 1.3–1.5 mm. long, the lobes without lateral lobes; anthers about 1–1.2 mm. long; staminodes ovate, about 1.3–1.7 mm. long; ovary short-hairy or subglabrous, the style about 1.2–1.9 mm. long; fruit narrowly ellipsoid, about 12–13 mm. long.

TYPE COLLECTION: *Picarda 1242,* "Haiti in Plaine," June (NY).

DISTRIBUTION: Haiti and the Dominican Republic.

HAITI: *Ekman H2021* (US); *Leonard 10003* (G, NY, US), *14718* (A, G, US), *14899* (US), *15879* (NY, US). DOMINICAN REPUBLIC: *Ekman 15576* (US).

Urban established a separate section *Bumeliopsis* for *B. Picardae,* based on the suppression of the lateral lobes of the corolla-lobes. Three other species (and occasionally a fourth) are now known to share this character, but it is doubtful that they are sufficiently closely related to form a natural section. *Bumelia Picardae* seems related to *B. obovata, B. conferta* is obviously close to *B. rotundifolia,* and *B. revoluta* and *B. integra* are of doubtful affinities, perhaps allied to *B. retusa.* All of these species are probably eventually derived from and not distinctly related to *B. obtusifolia,* in which the lateral lobes are occasionally suppressed.

22. **Bumelia integra** nom. nov.

Dipholis anomala Urb. Symb. Ant. 7: 325. 1912. Not *Bumelia anomala* Clark.

Unarmed tree; leaves obovate or elliptic, obtuse or rounded at the apex, tapering to the base, about 2.5–5 cm. long and 1.5–2.5 cm. wide, short-petiolate, very finely and densely rufous-strigose on both sides at first, very soon glabrate above, more tardily so beneath, not very veiny, only the midrib and primary lateral veins evident beneath, only the midrib above; flowers in dense axillary clusters of about 5–25, subsessile, the stout rufous-strigose pedicels 2 mm. long or less; sepals nearly glabrous; corolla about 3.2 mm. long, white, the lobes double the tube, without lateral lobes;

anthers about 0.9 mm. long; ovary appressed-hairy; style about 2.5 mm. long; fruit unknown.

TYPE COLLECTION: *Fuertes 1039,* "Barahona, ad El Hoyo," Dominican Republic, 700 m., Sept., 1911 (A, G, NY, US).

DISTRIBUTION: Known only from the type collection, Dominican Republic.

This species is transferred from *Dipholis* to *Bumelia* because of its hairy ovary and because suppression of the lateral lobes of the corolla-lobes, while occurring in several species of *Bumelia*, is otherwise unknown in *Dipholis*. More certain determination of its affinities awaits the collection of fruiting material.

23. **Bumelia revoluta** Urb. Symb. Ant. 9: 417. 1925.

Unarmed shrub or small tree about 3–4 m. tall; young twigs strigose-puberulent with rufous hairs; leaves firm, more or less revolute, obovate to narrowly oblong, about 7–25 mm. long and 2–6 mm. wide, green and shiny above, covered beneath with a dense rufous sericeous-tomentose pubescence, which becomes thinner, paler, and more strigose in age, not at all veiny above, only the midrib evident beneath, subsessile, the petioles about 1–3 mm. long; flowers 1 or seldom 2 in the axils, the rufous-hairy pedicels about 2–4 mm. long; sepals rufous-hairy, about 2.5 mm. long; corolla (not seen by me) about 3 mm. long, the lobes without lateral lobes; ovary pubescent; fruit unknown.

TYPE COLLECTION: *Ekman 15261,* "Sierra de Nipe prope Woodfred in fruticetis carrascales ca. 500 m.," Oriente, Cuba, September (NY).

DISTRIBUTION: Oriente, Cuba.

CUBA: Oriente: *Ekman 4034* (US); *Shafer 3181* (NY).

DOUBTFUL AND EXCLUDED SPECIES

Bumelia amazonica Krause, Notizbl. Bot. Gart. Berlin 6: 170. 1914. Dubious; possibly a *Pouteria;* type-photo seen.

Bumelia ambigua Ten. Sem. Hort. Neap. 1827. Nom. dub.

Bumelia argentea Roem. & Schult. Syst. 4: 499. 1819 = HEERIA ARGENTEA.

Bumelia Auzuba Roem. & Schult. l.c. = MASTICHODENDRON sp.

Bumelia borbonica Lodd. ex Loud. Hort. Brit. 69. 1830. Nom. dub.

Bumelia crenulata Spreng. Syst. 1: 665. 1825. Apparently not sapotaceous.

Bumelia cuneifolia Rudge, Pl. Guian. 1: 30. 1805 = CHRYSOPHYLLUM CUNEIFOLIUM.

Bumelia denticulata Raf. New Fl. Am. 3: 29. 1836. Not sapotaceous.

Bumelia depressa Urb. & Ekm. Ark. Bot. 22A(17): 73. 1929. Not sapotaceous.

Bumelia dulcifica Schum. & Thonn. Beskr. Gui. Pl. 130. 1827 = POUTERIA DULCIFICA, according to Baehni.

Bumelia foetidissima Willd. Sp. Pl. 1: 1086. 1797 = MASTICHODENDRON sp.

Bumelia laurifolia Standl. Trop. Woods 18: 31. 1929 = POUTERIA AMYGDALINA.

Bumelia lucida Roem. & Schult. Syst. 4: 499. 1819. Nom. dub.

Bumelia macrantha Willd. ex Roem. & Schult. Syst. 4: 802. 1819 = ARDISIA sp.

Bumelia Manglillo Willd. Sp. Pl. 1: 1087. 1797 = MYRSINE MANGLILLO.

Bumelia Mastichodendron Roem. & Schult. Syst. 4: 493. 1819 = MASTICHODENDRON sp.

Bumelia multiflora Roem. & Schult. Syst. 4: 498. 1819. Not sapotaceous.

Bumelia nervosa Vahl. Eclog. Am. 1: 28. 1796 = POUTERIA MACROPHYLLA.
Bumelia pallida Sw. Prodr. Veg. Ind. Occ. 49. 1788 = MASTICHODENDRON sp.
Bumelia pauciflora Roem. & Schult. Syst. 4: 493. 1819 = MASTICHODENDRON sp.
Bumelia pubescens Ten. Sem. Hort. Neap. 1827. Nom. dub.
Bumelia punctata Roem. & Schult. Syst. 4: 498. 1819. Not sapotaceous.
Bumelia serrata Pursh, Fl. Am. Sept. 1: 155. 1814 = PRUNUS CAROLINIANA.
Bumelia serrulata Raf. New Fl. Am. 3: 29. 1836. Not sapotaceous.
Bumelia strigosa Spreng. Syst. 1: 665. 1825. Nom. dub.
Bumelia undulata Raf. New Fl. Am. 3: 28. 1836. Probably not sapotaceous.

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